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United States Department of Agriculture

Soil Conservation Service

In cooperation with Massachusetts Agricultural Experiment Station

Soil Survey of Worcester County Massachusetts

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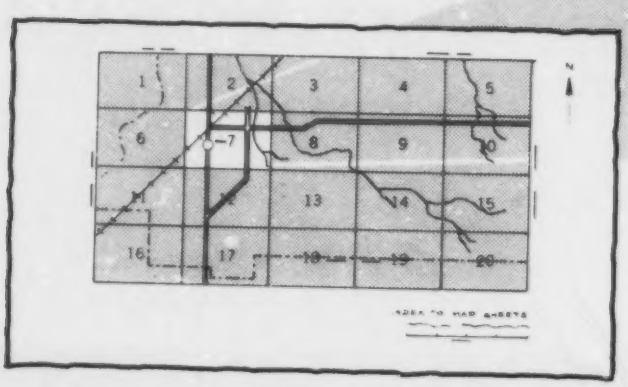

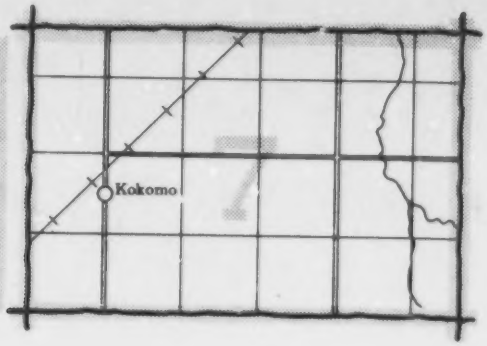

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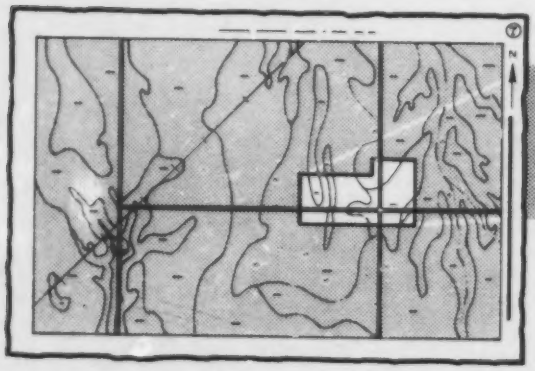

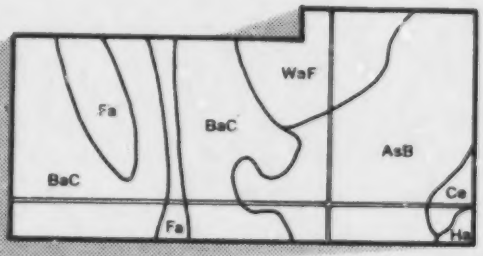

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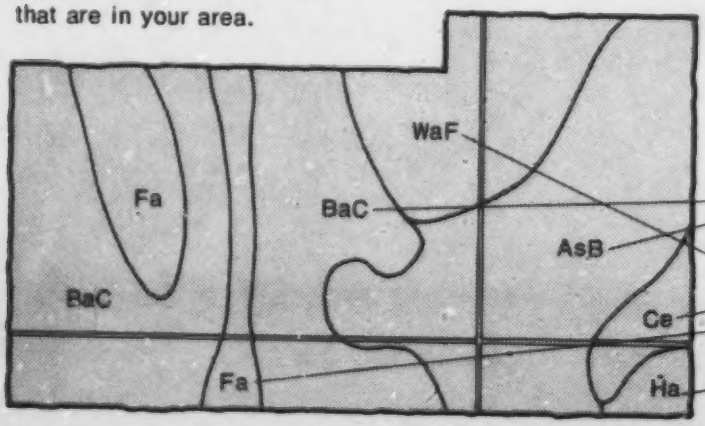

Symbols

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HIS SOIL SURVEY

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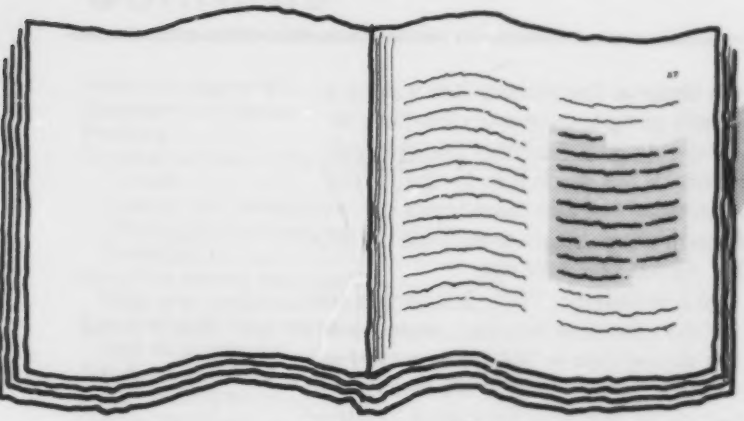

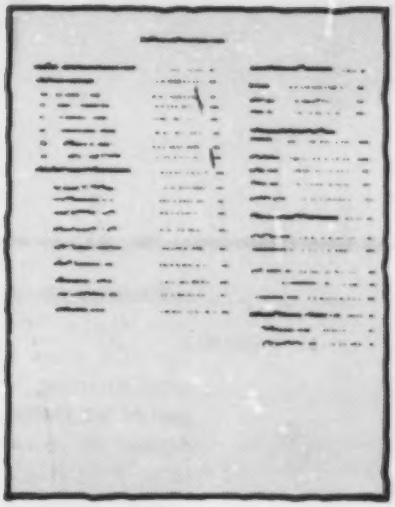

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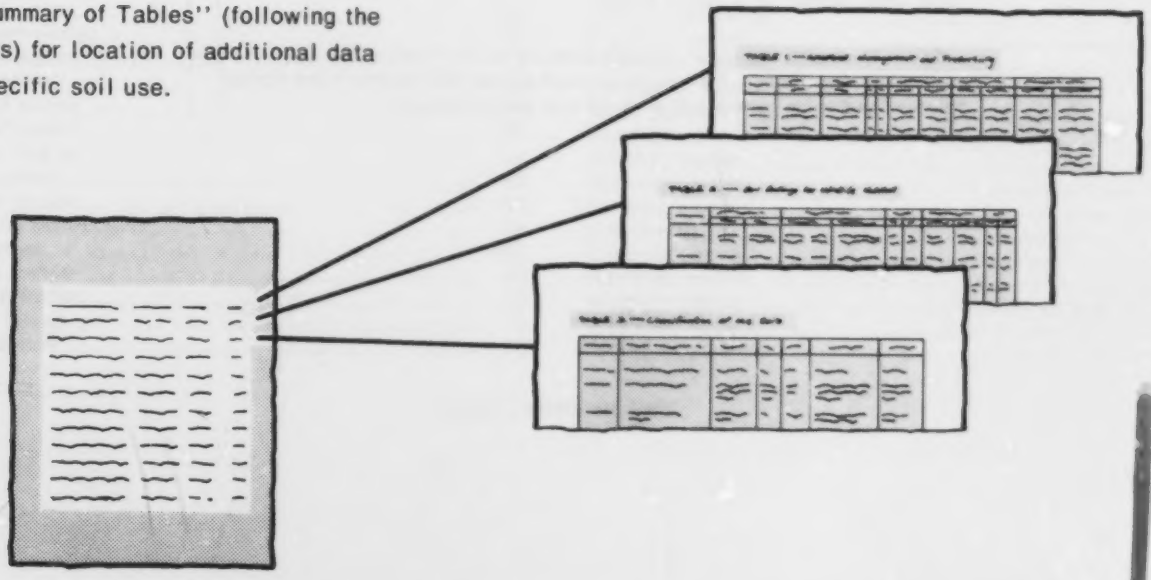

7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

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This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in 1981. Soil names and descriptions were approved in 1982. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1982. This survey was made cooperatively by the Soil Conservation Service and the Massachusetts Agricultural Experiment Station. It is part of the technical assistance furnished to the Northeastern Worcester County Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Wachusett Reservoir. A nearly level area in the Hinckley-Merrimac-Windsor general soil map unit is in the foreground, and a more sloping area in the Paxton-Woodbridge-Canton general soil map unit is in the background.

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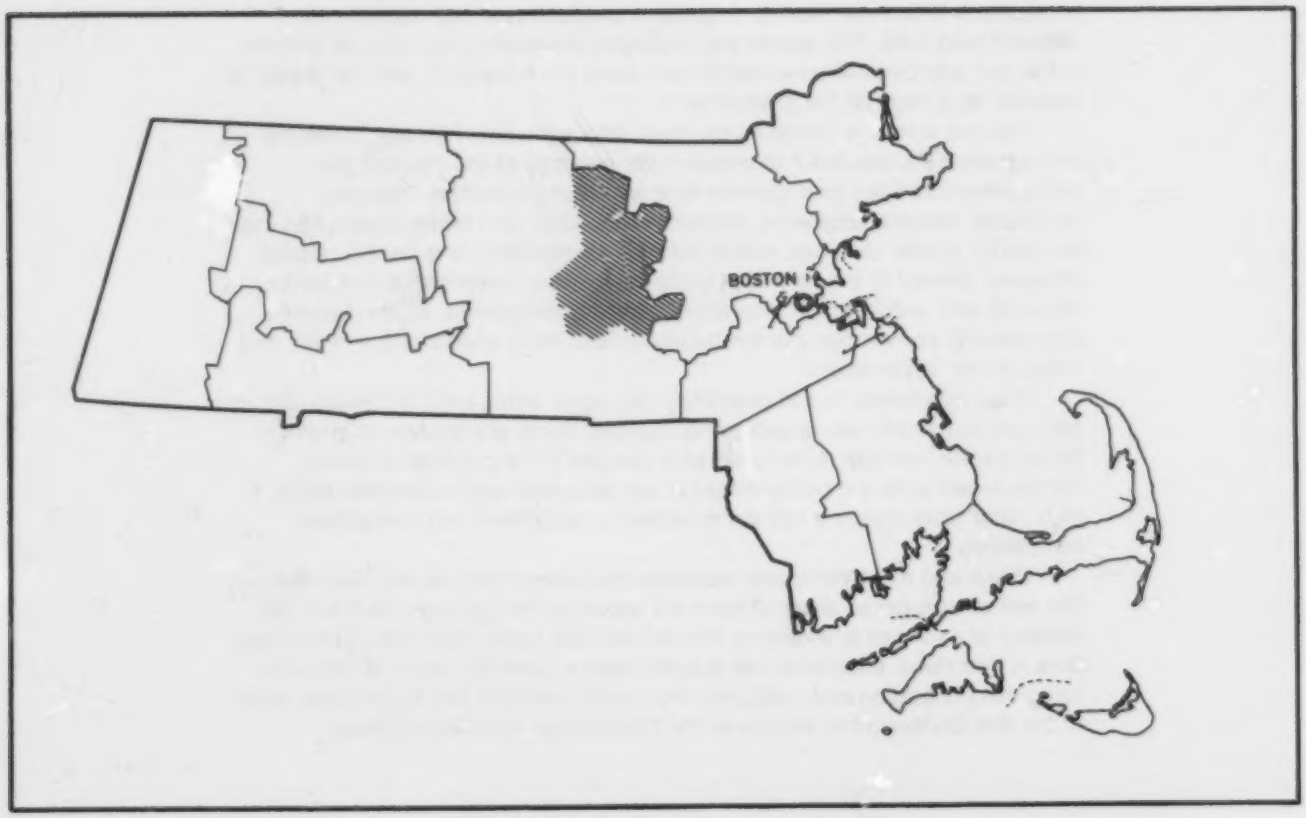
Preface

This soil survey contains information that can be used in land-planning programs in Worcester County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.



Location of Worcester County, Northeastern Part, in Massachusetts.

Soil Survey of Worcester County, Massachusetts, Northeastern Part

Communities of Berlin, Bolton, Boylston, Clinton, Fitchburg, Harvard, Holden, Lancaster, Leominster, Lunenburg, Northborough, Shrewsbury, Southborough, Sterling, Westborough, West Boylston, and Worcester

By William H. Taylor and Charles F. Hotz, Soil Conservation Service

Fieldwork by Norville E. Barnes, John F. Handler, Everett L. Francis, Charles F. Hotz, and William H. Taylor, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
In cooperation with
Massachusetts Agricultural Experiment Station

WORCESTER COUNTY is in the central part of Massachusetts. The area covered by this survey is 238,100 acres, or about 372 square miles. The Blackstone River drains all or parts of the five communities in the southern part of the survey area. The Sudbury, Assabet, and Nashua Rivers, all tributaries of the Merrimac River, drain the remainder of the survey area. The elevation of the area ranges from 185 to 1,340 feet above sea level.

Farm production in the area has been decreasing since about the 1800's because of the demands of urban and industrial growth. The main farm product is apples, but nurseries that produce ornamental stock are common. The major mineral resources are sand and gravel for construction purposes. Two water resource areas, Wachusett Reservoir and Sudbury Reservoir, were built to supply water to the Boston area.

This soil survey is an update to a soil survey of Worcester County that was published in 1927, and it provides maps that show the soils in greater detail (*5*).

General Nature of the Survey Area

This section gives general information about the survey area and describes some of the cultural and natural factors that affect the use and characteristics of the soils.

Climate

Winters in the survey area are cold, and summers are moderately warm with occasional hot spells. The mountains are markedly cooler than the main agricultural areas in the lowlands. Precipitation is well distributed throughout the year and is nearly always adequate for all crops. Winter snows occur frequently, occasionally as blizzards, and cover the ground much of the time.

Table 1 gives data on temperature and precipitation for the survey area, as recorded at Fitchburg, Massachusetts, for the period 1951 to 1978. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 26 degrees F, and the average daily minimum temperature is 16 degrees. The lowest temperature on record, which occurred at Fitchburg on January 14, 1957, is -21 degrees. In summer the average temperature is 70 degrees, and the average daily maximum temperature is 82 degrees. The highest recorded temperature, which occurred on August 3, 1975, is 105 degrees.

Growing degree days, shown in Table 1, are equivalent to heat units. During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 22 inches, or 50 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 17 inches. The heaviest 1-day rainfall during the period of record was 4.43 inches at Fitchburg on September 12, 1954. Thunderstorms occur on about 21 days each year, and most occur in summer.

Average seasonal snowfall is 65 inches. The greatest snow depth at any one time during the period of record was 27 inches. On the average, 22 days have at least 1 inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 75 percent. The percentage of possible sunshine is 65 percent in summer and 50 percent in winter. The prevailing wind is from the west. Average windspeed is highest, 12 miles per hour, in winter.

Climatic data for this section were prepared for the Soil Conservation Service by the National Climatic Center, Asheville, North Carolina.

History and Development

Worcester County was formally estabished in 1731. The first settlement, Lancaster Plantation, was established in 1641. The settlement of Quinsigamond was established in 1673, later abandoned because of hostile indians, and re-established in 1713 as Worcester.

The first settlers established their farms and towns on the uplands. They cut and burned the forests and removed the stones to clear the land for farming. In the mid-1800's about 80 percent of the land in the survey area was cleared for crops, hay, or pasture. The developing industrial enterprises utilized the abundant streams as sources of power, and the workers built houses near the mills and factories.

In the early 1800's manufacturing industries produced hats, clocks, paper, cards, carpets, corduroy, cotton and wool fabrics, and weaving machinery. In 1965, the major products were nonelectrical machinery, fabricated metals, textile mill products, primary metals, rubber products, leather and leather products, and furniture and fixtures. Other products included paper, tools and dyes, and abrasives.

The early agriculture was almost entirely self sufficient. Farmers grew wheat, corn, potatoes, buckwheat, flax, vegetables, and fruit for family use. They produced meat, butter and cheese, eggs, and wool. In time, small surpluses were produced for market in the larger towns. Still later, markets developed in Boston, Providence, and Springfield. The peak of agriculture came during the Civil War. Later, the opening of land in the West and the advent of railroads and canal systems aided the development of the Nashoba apple belt. The Nashoba apple belt includes the towns of Berlin, Bolton, Harvard, Lancaster, Leominster, and Sterling and towns just north of the survey area. This area still leads the northeast in the production of apples. The farms now in the survey area produce mainly fruits, vegetables, milk, and eggs. Beef, hogs, and flowers are minor specialty products. Off-farm employment is a supplementary source of income for many farmers on the smaller farms.

Timber apparently was never produced on a sustained yield basis in the survey area, even during the height of the lumbering industry. The second-growth hardwoods in the late 1800's and early 1900's were used for flooring, interior finishing, furniture, buggies, wagons, and farm implements, as well as for fuel. The white pine, which had established itself in the abandoned fields, formed the basis of a box industry which lasted for nearly 40 years. At present, about 43 percent of the land in the survey area is wooded. Most of the woodland is in poor condition and is harvested mainly for firewood and fenceposts. A small portion of the woodland is actively managed for timber production and Christmas trees.

Physiography, Relief, and Drainage

The survey area is the central upland province of Southern New England. In the western edge of the survey area, the local relief generally is 150 to 200 feet. Some of the higher summits are at an elevation of 1,000 to 1,200 feet above sea level, such as the Worcester Airport at 1,000 feet and South Monoosnoc Hill in Leominster at 1,159 feet.

In the rest of the survey area, the local relief generally ranges from 70 to 120 feet. The highest elevations are about 800 feet above sea level and include Rawson Hill in Shrewsbury at 755 feet and Oak Hill in Harvard at 612 feet.

The boundary between the western edge and the rest of the survey area is a subdued escarpment running from Fitchburg through Sterling to Worcester. The steep slopes west of the North Nashua River, Wachusett Reservoir, and Lake Quinsigamond are part of this escarpment.

Geology

The survey area is believed to have been subjected to the four major continental glaciers known to have occurred in North America. The most recent, the Wisconsin glacier, is estimated to have been about 2 miles thick at its maximum stage in this area. The glacier rode over some of the loose material overlying the bedrock and formed drumlins, or rounded, long and narrow hills consisting of firm material. There are many drumlins in the survey area, but few with the "perfect" shape of the classic drumlin found in other parts of Massachusetts.

As the glacier melted and retreated, it dumped along the receding face the load of boulders, stones, and soil it had gathered in while moving southward. This heterogeneous material is called glacial till and, with the drumlins, constitutes most of the land surface of the survey area. The meltwater from the receding glacier picked up some of this glacial till, sorted it according to particle size and water velocity, and redeposited it downstream from the glacier. This material is called glacial outwash. It contains layers of different thicknesses which often have contrasting particle sizes, ranging usually from sand to cobblestones. Where this redeposition covers a broad area, it is called an outwash plain. The region surrounding the Nashua River Valley is an example of an outwash plain.

When the meltwater reaches a glacial lake, it drops its silt and clay particles. These materials are glaciolacustrine deposits, or lakebed sediments. They commonly have thin horizontal bands, or varves, that are alternately coarser and finer, and each pair is thought to represent 1 year's deposition.

In the 12,000 to 15,000 years since the final retreat of the glacier, the streams of the county have deposited material on their flood plains. This material is called alluvium. It tends to be coarser along the smaller, swifter streams than it is along the larger, slower streams.

The prominent peaks in the survey area consist of hard rock that resisted the crushing, scouring action of the glacier. The peaks have the greatest local relief in the area, as much as 700 feet above nearby valley floors. Slopes range mostly from strongly sloping to very steep. The areas of drumlins and glacial till have local relief that averages about 200 feet, and most of the slopes range from gently sloping to strongly sloping. The areas of glacial outwash generally have relief of less than 50 feet. Slopes mainly are nearly level to moderately sloping, but terrace escarpments are steeper. The areas of glaciolacustrine deposits have very low relief, typically 20 feet or less, and slopes are nearly level or gently sloping.

How This Survey was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons in a soil. The profile extends from the surface down into the unconsolidated material. The unconsolidated material is generally devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their positon to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

1. Winooski-Limerick-Saco

Very deep, nearly level soils that are moderately well drained, poorly drained, and very poorly drained; on flood plains

This map unit consists of broad areas and small depressions. The soils formed in alluvium deposited by the floodwaters of the Nashua River.

This map unit makes up about 1 percent of the survey area. The unit is about 34 percent Winooski soils, 25 percent Limerick soils, 16 percent Saco soils, and 25 percent soils of minor extent (fig. 1).

The Winooski soils are moderately well drained and are at the higher elevations. The permeability of the soils is moderate to moderately rapid. The high water table is between depths of 1 1/2 and 3 feet for much of the year.

The Limerick soils are poorly drained and are in slight depressions adjacent to the river and at slightly higher elevations. The permeability of the soils is moderate. The high water table is between depths of 6 inches and 1 1/2 feet for much of the year.

The Saco soils are very poorly drained and are in pockets and depressions along the river channel. The permeability of the soils is moderate to rapid in the substratum. The high water table is between the surface and a depth of 6 inches for much of the year.

The dominant minor soils in this map unit are well drained Hadley soils, excessively drained Suncook soils, and very poorly drained Swansea soils. The Hadley soils are on the upper slope from the river. The Suncook soils are on mounds along the river bank, and the Swansea soils are in depressions on the flood plain.

Most areas of these soils are farmed. Some areas are used for wildlife habitat, and some are in native vegetation.

This unit is suitable for woodland, cultivated crops, hay, and pasture. Flooding and the high water table are the main limitations for farming and woodland, and they limit the use of the unit for most types of community development.

2. Hinckley-Merrimac-Windsor

Very deep, nearly level to steep soils that are excessively drained and somewhat excessively drained; on outwash plains

This map unit consists of broad plains and rolling to steep areas scattered throughout the survey area. The soils formed in water-sorted deposits of glacial outwash.

This map unit makes up about 25 percent of the survey area. The unit is about 27 percent Hinckley soils, 20 percent Merrimac soils, 9 percent Windsor soils, and 44 percent soils of minor extent (fig. 2).

The Hinckley soils are nearly level to steep, are excessively drained, and are on ridges. The permeability of the soils is rapid in the subsoil and very rapid in the substratum. Typically, these soils have a loamy surface layer underlain by stratified sand and gravel.

The Merrimac soils are nearly level to moderately steep, are somewhat excessively drained, and are in the lower areas of the outwash plains. The permeability of the soils is moderately rapid or rapid. Typically, the soils consist of 2 feet of loamy material over sand and gravel.

The Windsor soils are nearly level to moderately steep, are excessively drained, and are in the lower areas of the outwash plains. The permeability of the soils is rapid or very rapid. Typically, these soils are sandy throughout.

The dominant minor soils in this map unit are moderately well drained Deerfield and Sudbury soils and very poorly drained Scarboro soils. The Deerfield and Sudbury soils are in swales, and the Scarboro soils are in deep depressions.

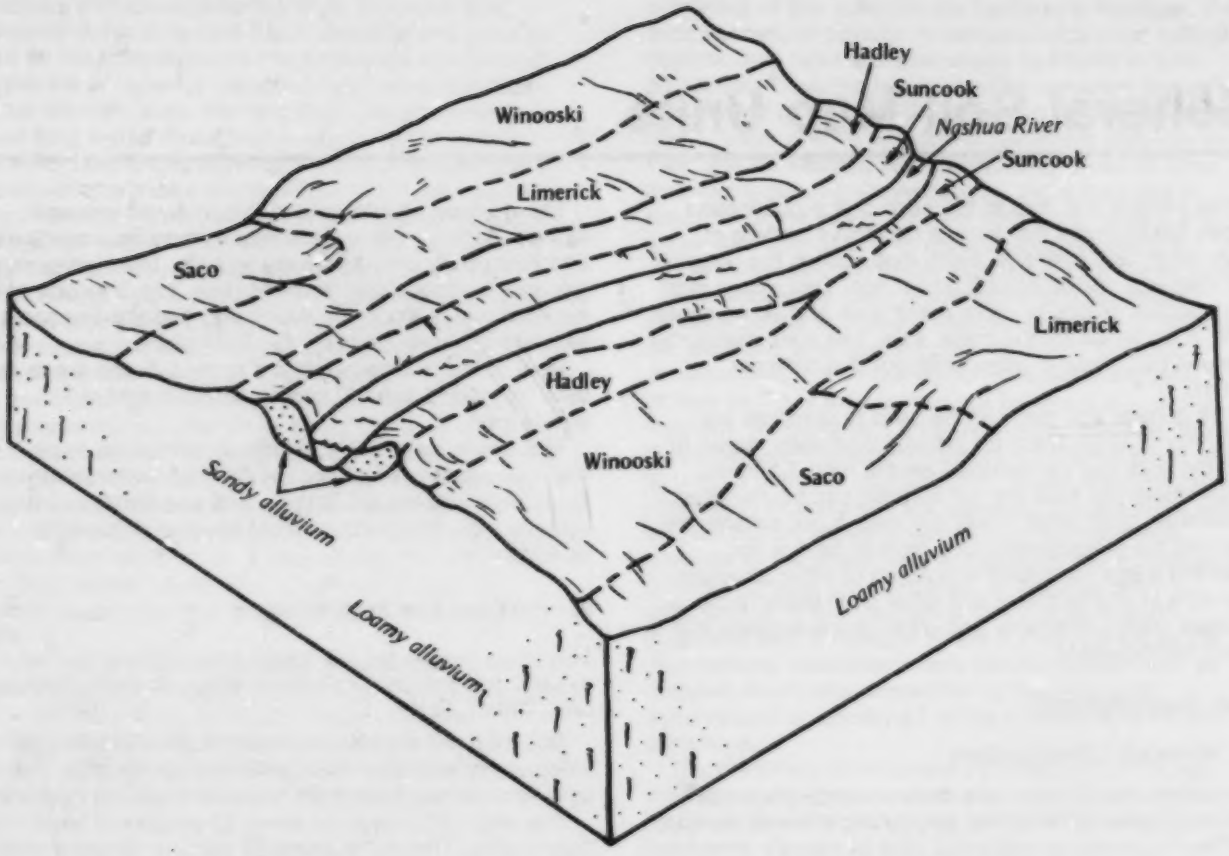


Figure 1.—Typical pattern of soils and parent material in the Winooski-Limerick-Saco map unit.

Most of this unit is farmed or used for urban centers. A few areas are covered with trees.

This unit is suitable for woodland, cultivated crops, hay, and pasture. Slope in some areas, droughtiness, and low nutrient content are the main limitations for farming. Seedling mortality is high because of the lack of moisture in these soils.

In some areas, slope is a limitation, but in most areas there are essentially no limitations for dwellings and local roads and streets. The sides of shallow excavations are unstable, and the steep sides commonly collapse. The rapid permeability in the substratum of the soils causes a hazard of ground-water pollution in areas used for septic tank absorption fields.

3. Paxton-Woodbridge-Canton

Very deep, nearly level to steep soils that are well drained and moderately well drained; on uplands

This map unit consists of upland hills and ridges dissected by many small drainageways. Stones cover more than 3 percent of the surface of most areas. The soils formed in glacial till.

This unit makes up about 56 percent of the survey area. The unit is about 40 percent Paxton soils, 18 percent Woodbridge soils, 8 percent Canton soils, and 34 percent soils of minor extent (fig. 3).

The Paxton soils are gently sloping to steep, are well drained, and are on hills and ridges. The permeability of the soils is slow to very slow in the substratum. The substratum, which is at a depth of about 27 inches, is very firm.

The Woodbridge soils are nearly level to strongly sloping, are moderately well drained, and are on top of hills and drumlins. The permeability of the soils is slow or

very slow in the substratum. The substratum is at a depth of about 22 inches and is very firm.

The Canton soils are gently sloping to steep, are well drained, and are on the toe slopes of ridges. The permeability of the soils is moderately rapid to rapid. The substratum is friable.

The dominant minor soils are poorly drained Ridgebury soils and very poorly drained Whitman and Swansea soils, all of which are in depressions and low-lying areas.

Most of this unit is covered with trees. Some areas are farmed, and a few areas are used for urban development.

This map unit is suitable for cultivated crops, hay, and pasture and is well suited to trees. Slope, an erosion hazard, stones on the surface, and a seasonal high water table are the main limitations for farming.

Slope, the seasonal high water table, a frost-action potential, and the firm substratum of the Paxton and Woodbridge soils are the major limitations of the unit for community development.

4. Chatfield-Hollis

Moderately deep and shallow, gently sloping to moderately steep soils that are well drained or somewhat excessively drained; on uplands

This map unit consists of hills and ridges with many bedrock exposures throughout. Stones cover more than 3 percent of the surface of most areas. The soils formed in glacial till.

This unit makes up about 15 percent of the survey area. The unit is about 45 percent Chatfield soils, 25 percent Hollis soils, and 30 percent soils of minor extent.

The Chatfield soils are on the lower slopes. Bedrock is at a depth of 20 to 40 inches. The permeability of the soils is moderate or moderately rapid.

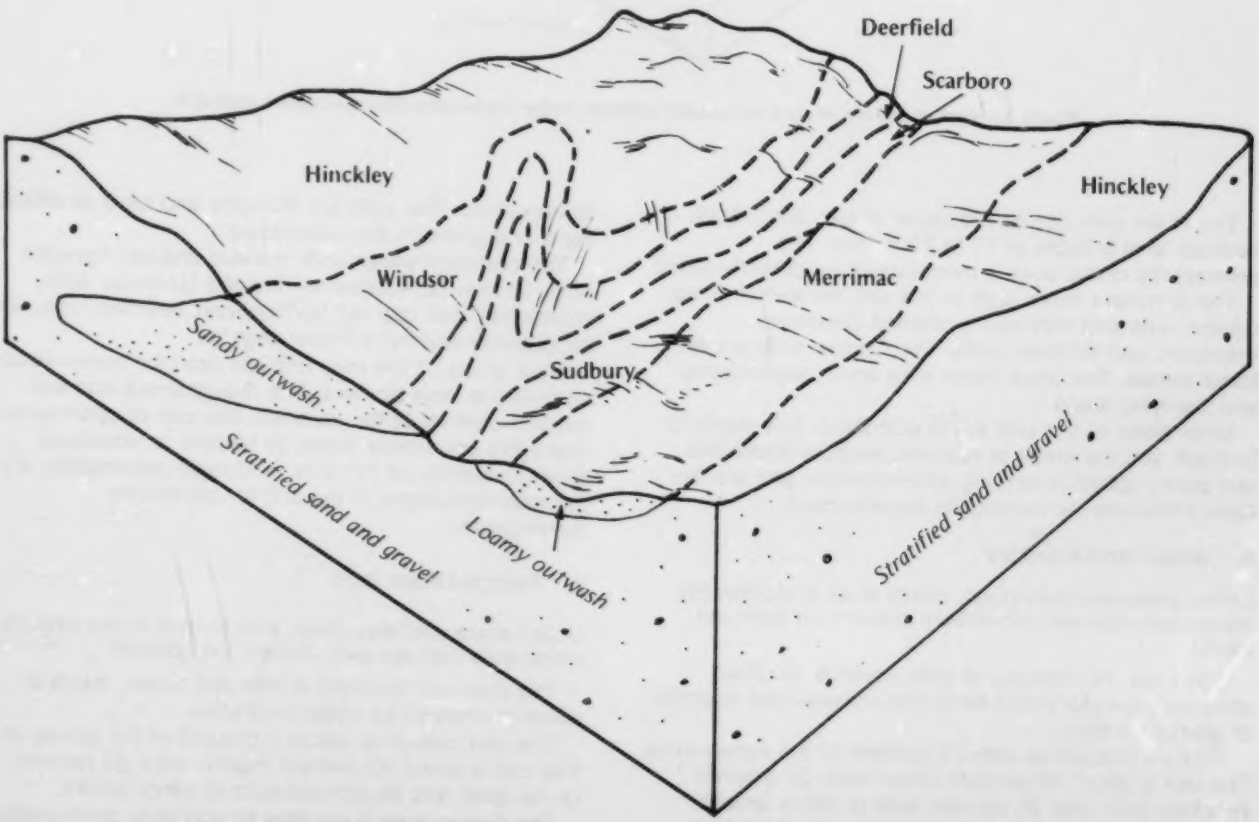


Figure 2.—Typical pattern of soils and parent material in the Hinckley-Merrimac-Windsor map unit.

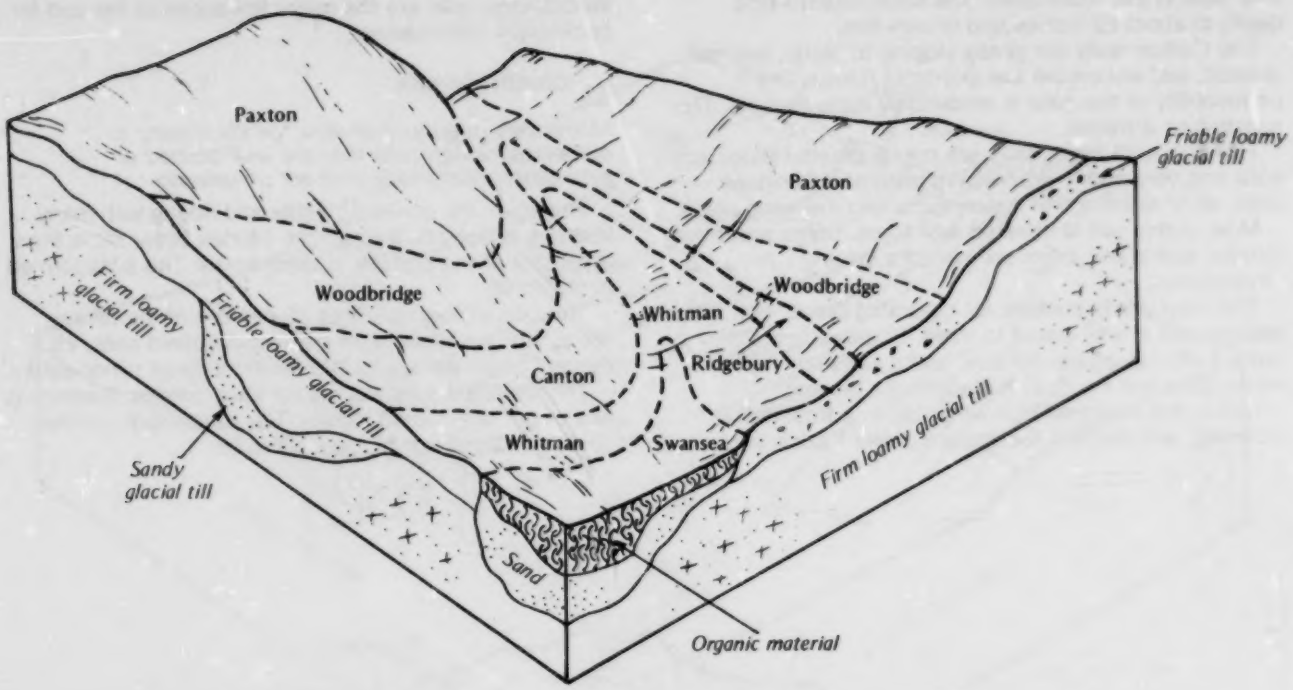


Figure 3.—Typical pattern of soils and parent material in the Paxton-Woodbridge-Canton map unit.

The Hollis soils are on the upper slopes and ridges. Bedrock is at a depth of 10 to 20 inches. The permeability of the soils is moderate or moderately rapid.

The dominant minor soils in this unit are well drained Canton soils and very poorly drained Swansea, Freetown, and Whitman soils. The Canton soils are on lower slopes. The other minor soils are in depressions and low-lying areas.

Most areas of this unit are in woodland. The depth to bedrock and the areas of exposed bedrock make this unit poorly suited to farming and woodland and are the main limitations for community development.

5. Urban land-Hinckley

Urban areas and very deep, nearly level to moderately steep soils that are excessively drained; on outwash plains

This map unit consists of soils covered by urban structures and soils that formed in water-sorted deposits of glacial outwash.

This unit makes up about 2 percent of the survey area. The unit is about 45 percent Urban land, 35 percent Hinckley soils, and 20 percent soils of minor extent.

The Hinckley soils are intermingled with the urban areas. The permeability of the soils is moderately rapid to very rapid. The soils are droughty and have stratified sand and gravel in the substratum.

The dominant minor soils are well drained Agawam soils, somewhat excessively drained Merrimac soils, moderately well drained Sudbury and Deerfield soils, and excessively drained Windsor soils.

Most areas of this map unit are used for homesite and commercial development. The droughtiness and low nutrient content of the soils and the lack of open space make this unit poorly suited to farming or woodland. Slope, instability of the soils, and rapid permeability are the main limitations of the unit for community development.

6. Paxton-Urban land

Urban areas and very deep, nearly level to moderately steep soils that are well drained, on uplands

This map unit consists of hills and ridges, much of which is covered by urban structures.

This unit makes up about 1 percent of the survey area. The unit is about 40 percent Paxton soils, 25 percent Urban land, and 35 percent soils of minor extent.

The Paxton soils have slow to very slow permeability in the substratum, and firm glacial till is at a depth of

about 2 feet. A few stones are on the surface of some areas.

The dominant minor soils in this unit are well drained Canton soils, poorly drained or somewhat poorly drained Ridgebury soils, and moderately well drained Woodbridge soils.

Most areas of this map unit are used for urban development. A few areas are in cropland. The main limitations of the Paxton soils for farming or woodland are the firm layer in the substratum and a lack of open space, which also limits further community development.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and management of the soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Canton stony fine sandy loam, 3 to 8 percent slopes, is one of several phases in the Canton series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Chatfield-Hollis-Rock outcrop complex, 3 to 15 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Amostown and Belgrade soils, 3 to 8 percent slopes, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, quarry, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

AgA—Agawam fine sandy loam, 0 to 3 percent slopes. This soil is very deep, nearly level, and well drained. It is in broad areas and in narrow areas adjacent to strongly sloping soils. The areas of this soil are long and narrow or irregular in shape. They range from 5 to 40 acres, but most are about 10 acres.

Typically, the surface layer is dark yellowish brown fine sandy loam about 7 inches thick. The subsoil is yellowish brown fine sandy loam 18 inches thick. The substratum extends to a depth of 60 inches or more. It is yellowish brown gravelly loamy coarse sand in the upper part and light olive brown and light yellowish brown very gravelly coarse sand in the lower part.

Included with this soil in mapping are small areas, less than 3 acres each, of Merrimac, Ninigret, and Windsor soils. Also included are soils that have more silt in the surface layer and subsoil than this Agawam soil. Included areas make up about 15 percent of the unit.

The permeability of this Agawam soil is moderately rapid in the subsoil and rapid in the substratum.

Available water capacity is high. Reaction ranges from very strongly acid to slightly acid.

Most areas of this soil are used for residential development. Some areas are used for cultivated crops. A few areas are covered with trees, and the soil is well suited to trees.

This soil is well suited to cultivated crops, hay, and pasture. Incorporating crop residue into the soil increases the organic matter content. The use of proper stocking rates, deferred grazing, and rotational grazing help to maintain the desirable pasture plant species.

This soil has no major limitation as a site for dwellings with basements or for local roads and streets. The soil is a poor filter for septic tank absorption fields, however, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability class: I.

AgB—Agawam fine sandy loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and well drained. It is in areas that are long and narrow or irregular in shape. The areas range from 5 to 80 acres, but most are about 20 acres.

Typically, the surface layer is dark yellowish brown fine sandy loam about 7 inches thick. The subsoil is yellowish brown fine sandy loam 18 inches thick. The substratum extends to a depth of 60 inches or more. It is yellowish brown gravelly loamy coarse sand in the upper part and light olive brown and light yellowish brown very gravelly coarse sand in the lower part.

Included with this soil in mapping are small areas, less than 3 acres each, of Merrimac, Ninigret, and Windsor soils. Also included are areas of Agawam soils with slopes of 0 to 3 percent and soils that have more silt in the surface layer and subsoil than this Agawam soil. Included areas make up about 15 percent of the unit.

The permeability of this Agawam soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is high. Reaction ranges from very strongly acid to slightly acid.

Most areas of this soil are used for residential development. Some areas are used for cultivated crops. A few areas are covered with trees, and the soil is well suited to trees.

This soil is well suited to cultivated crops, hay, and pasture. Maintaining a plant cover and using crop residue, conservation tillage, and contour farming are practices that help to reduce the hazard of erosion.

This soil has no major limitation as a site for dwellings with basements or for local roads and streets. The soil is a poor filter for septic tank absorption fields, however, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IIe.

AgC—Agawam fine sandy loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is in long and narrow or irregularly shaped areas. The areas range from 5 to 60 acres, but most areas are about 10 acres.

Typically, the surface layer is dark yellowish brown fine sandy loam about 7 inches thick. The subsoil is yellowish brown fine sandy loam 18 inches thick. The substratum extends to a depth of 60 inches or more. It is yellowish brown gravelly loamy coarse sand in the upper part and light olive brown and light yellowish brown very gravelly coarse sand in the lower part.

Included with this soil in mapping are small areas, less than 3 acres each, of Merrimac, Ninigret, and Windsor soils. Also included are areas of Agawam soils with slopes of 3 to 8 percent and soils that have more silt in the surface layer and subsoil than this Agawam soil. Included areas make up about 10 percent of the unit.

The permeability of this Agawam soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is high. Reaction ranges from very strongly acid to slightly acid.

Most areas of this soil are covered with trees, and the soil is well suited to trees. Some areas are used for residential development, and a few areas are in cropland.

This soil is suited to cultivated crops, hay, and pasture. Slope is the main limitation for farming. Maintaining a plant cover and using crop residue, stripcropping, conservation tillage, and contour farming are practices that help reduce the erosion hazard.

Slope is a limitation of the soil as a site for dwellings with basements or for local roads and streets. Using a special design, grading and filling, and using retaining walls are ways of overcoming the slope limitation for building sites. Constructing local roads and streets on the contour will help avoid steep cuts, on which plant cover is difficult to maintain. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IIIe.

AmB—Amostown and Belgrade soils, 3 to 8 percent slopes. These soils are very deep, gently sloping, and moderately well drained. They are in irregularly shaped areas. The areas range from 5 to 50 acres, but most are about 10 acres. The total acreage of the unit is about 40 percent Amostown soils, 30 percent Belgrade soils, and 30 percent other soils. Some areas are mostly Amostown soils, some are mostly Belgrade soils, and some are both. The soils were mapped together because they have no major differences in use and management.

Typically, the Amostown soils have a surface layer of dark brown fine sandy loam about 8 inches thick. The subsoil is light olive brown fine sandy loam 22 inches thick. The substratum extends to a depth of 60 inches or more. It is light olive brown loamy sand in the upper part

and olive gray stratified silt and loamy fine sand in the lower part.

Typically, the Belgrade soils have a surface layer of dark brown silt loam about 10 inches thick. The subsoil is yellowish brown silt loam and light olive brown silt loam 26 inches thick. The substratum is light olive brown silt loam to a depth of 60 inches or more.

Included with this unit in mapping are small areas, less than 3 acres each, of Raynham soils. Also included are nearly level and strongly sloping areas of Amostown and Belgrade soils and areas that are well drained.

The permeability of these Amostown soils is moderately rapid in the subsoil and slow to very slow in the substratum. The permeability of these Belgrade soils is moderate in the subsoil and slow to moderately rapid in the substratum. Available water capacity in both soils is high. Reaction ranges from strongly acid to neutral in the Amostown soils and from very strongly acid to neutral in the Belgrade soils. The root zone is restricted by the seasonal high water table at a depth of 1 1/2 to 3 feet.

Some areas of this unit are covered with trees, and the unit is well suited to trees. Some areas are in cropland, and a few are used for building sites.

This unit is well suited to cultivated crops, hay, and pasture. Drainage is needed in some areas, and using conservation tillage and contour farming helps to reduce erosion.

Wetness, low strength, and a frost-action potential are limitations of these soils as a site for dwellings and local roads and streets. Some form of drainage is needed for homesites with basements. Using a suitable base material and grading and filling help to improve the suitability of the soils as a site for local roads and streets. These soils are poor material for septic tank absorption fields because of the wetness and the permeability in the substratum of the Amostown soils.

Capability subclass: IIe.

CaB—Canton fine sandy loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and well drained. It is on the lower slopes of hills. The areas are irregular in shape. They range from 5 to 25 acres, but most are about 15 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is 22 inches thick. The upper 3 inches is strong brown fine sandy loam, and the lower 19 inches is yellowish brown fine sandy loam and gravelly fine sandy loam. The substratum is grayish brown gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, less than 3 acres each, of Paxton and Woodbridge soils. Also included are soils that have more sand in the subsoil than this Canton soil, soils with slopes of 0 to 3 percent, and soils that have more silt in the substratum than this Canton soil. Included areas make up about 25 percent of the unit.

The permeability of this Canton soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are covered with trees, and the soil is well suited to trees. Some areas are in cropland, and a few are used for residential development.

This soil is well suited to cultivated crops, hay, and pasture. Maintaining a plant cover and using crop residue, conservation tillage, stripcropping, and contour farming are practices that help to reduce erosion.

This soil has essentially no limitation as a site for dwellings or for local roads and streets; however, the sides of excavations in this soil are unstable, and steep sides commonly collapse. Thus, some form of shoring is needed in deep cuts. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IIe.

CaC—Canton fine sandy loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on the upper slopes of hills. The areas are irregular in shape. They range from 5 to 30 acres, but most are about 20 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is 22 inches thick. The upper 3 inches is strong brown fine sandy loam, and the lower 19 inches is yellowish brown fine sandy loam and gravelly fine sandy loam. The substratum is grayish brown gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, less than 3 acres each, of Paxton and Woodbridge soils. Also included are areas that have more sand in the subsoil than this Canton soil and areas that have more silt in the substratum. Included areas make up about 20 percent of the unit.

The permeability of this Canton soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are covered with trees, and the soil is well suited to trees. Some areas are in cropland, and a few are used for residential development.

This soil is suited to cultivated crops, hay, and pasture. Maintaining a plant cover and using crop residue, conservation tillage, stripcropping, and contour farming are practices that help to reduce erosion.

Slope is the main limitation of this soil as a site for dwellings and roads and streets. Special design, grading and filling, and using retaining walls are practices that

help to overcome the slope limitation. The sides of excavations in this soil are unstable, and the steeper sides commonly collapse. Placing local roads and streets on contours is needed to avoid steep cuts, on which plant cover is difficult to maintain. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IIIe.

CbB—Canton fine sandy loam, 3 to 8 percent slopes, very stony. This soil is very deep, gently sloping, and well drained. It is on the lower slopes of hills. Stones that are 5 to 30 feet apart cover from less than 1 percent to 3 percent of the surface. The areas of this unit are irregular in shape. They range from 10 to 125 acres, but most are about 50 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is 22 inches thick. The upper 3 inches is strong brown fine sandy loam, and the lower 19 inches is yellowish brown fine sandy loam and gravelly fine sandy loam. The substratum is grayish brown gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, less than 3 acres each, of Paxton and Woodbridge soils. Also included are soils that have more sand in the subsoil than this Canton soil, soils with slopes of 0 to 3 percent, and soils that have more silt in the substratum than this Canton soil. Included areas make up about 20 percent of the unit.

The permeability of this Canton soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are covered with trees, and the soil is well suited to trees. Some areas have been cleared for pasture, and a few areas are used for residential development.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. The soil is well suited to those uses if the stones are removed. Cultivation of this soil increases the hazard of erosion. Maintaining a plant cover and using crop residue, conservation tillage, and contour stripcropping are practices in cultivated areas that help to reduce erosion.

This soil has essentially no limitation as a site for dwellings and local roads and streets. Sides of excavations in these soils are unstable, however, and the steeper sides commonly collapse. Thus, shoring is needed in steep cuts. This soil is a poor filter for septic tank absorption fields and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: VIs.

CbC—Canton fine sandy loam, 8 to 15 percent slopes, very stony. This soil is very deep, strongly sloping, and well drained. It is on the sides of hills and the tops of ridges. Stones that are 5 to 30 feet apart cover from less than 1 percent to 3 percent of the surface. The areas of this unit are irregular in shape. They range from 10 to 100 acres, but most are about 40 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is 22 inches thick. The upper 3 inches is strong brown fine sandy loam, and the lower 19 inches is yellowish brown fine sandy loam and gravelly fine sandy loam. The substratum is grayish brown gravelly loamy sand to a depth of 60 inches or more.

Included in mapping are small areas, less than 3 acres each, of Paxton and Woodbridge soils. Also included are areas of soils that have more sand in the subsoil than this Canton soil and areas that do not have stones on the surface. Included areas make up about 15 percent of the unit.

The permeability of this Canton soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are covered with trees, and the soil is well suited to trees. Some areas have been cleared and are used for pasture, and a few areas are used for residential development.

Slope and the stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Maintaining a plant cover and using crop residue, conservation tillage, contour farming, and stripcropping are practices in cultivated areas that help to reduce erosion.

Slope is the main limitation of this soil as a site for dwellings and local roads and streets. The sides of excavations in this soil are unstable, and the steeper sides commonly collapse. Thus, some form of shoring is needed when steep cuts are made. Locating roads and streets on the contour will help to avoid steep cuts, on which plant cover is difficult to maintain. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: VIs.

CcB—Canton fine sandy loam, 3 to 8 percent slopes, extremely stony. This soil is very deep, gently sloping, and well drained. It is on the lower slopes of hills. Stones that are 2 to 5 feet apart cover 3 to 15 percent of the surface. The areas of this unit are irregular in shape. They range from 10 to 160 acres, but most are about 40 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is 22

inches thick. The upper 3 inches is strong brown fine sandy loam, and the lower 19 inches is yellowish brown fine sandy loam and gravelly fine sandy loam. The substratum is grayish brown gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, less than 3 acres each, of Paxton and Woodbridge soils. Also included are areas of soils that have more sand in the subsoil than this Canton soil, areas of Canton soils with slopes of 0 to 3 percent, and areas where stones cover less than 3 percent of the surface. Included areas make up about 20 percent of the unit.

The permeability of this Canton soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are covered with trees. A few areas are used for residential development.

The stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Erosion is a hazard. Maintaining a plant cover and using crop residue, conservation tillage, contour farming, and stripcropping are practices that help to reduce erosion in cultivated areas.

This soil is suited to trees. The stones on the surface limit the use of some types of woodland equipment.

Although clearing of stones is necessary in some areas, the soil essentially has few or no limitations as a site for dwellings or local roads and streets. The sides of excavations in this soil are unstable, however, and the steeper sides commonly collapse. Thus, some form of shoring is needed. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water pollution.

Capability subclass: VIIs.

CcC—Canton fine sandy loam, 8 to 15 percent slopes, extremely stony. This soil is very deep, strongly sloping, and well drained. It is on the sides of hills and the tops of ridges. Stones that are 2 to 5 feet apart cover 3 to 15 percent of the surface. The areas of this unit are irregular in shape. They range from 10 to 100 acres, but most are about 50 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is 22 inches thick. The upper 3 inches is strong brown fine sandy loam, and the lower 19 inches is yellowish brown fine sandy loam and gravelly fine sandy loam. The substratum is grayish brown gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, less than 3 acres each, of Paxton and Woodbridge soils. Also included are areas of soils that have more sand in the subsoil than this Canton soil and areas where stones cover less than 3 percent of the surface. Included areas make up about 15 percent of the unit.

The permeability of this Canton soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are covered with trees. A few areas are used for residential development.

Slope and the stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. Maintaining a plant cover and using crop residue, conservation tillage, contour farming, and stripcropping are practices that help to reduce erosion in cultivated areas.

This soil is suited to trees. The stones on the surface limit the use of some types of equipment.

Slope is the main limitation of this soil as a site for dwellings and local roads and streets. Stone removal is needed in some areas. The sides of excavations in this soil are unstable, and the steeper sides commonly collapse. Thus, some form of shoring is needed in deep cuts. Constructing roads and streets on the contour will help to avoid steep cuts, on which plant cover is difficult to maintain. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: VIIs.

CcD—Canton fine sandy loam, 15 to 25 percent slopes, extremely stony. This soil is very deep, moderately steep, and well drained. It is on the sides of hills and the tops of ridges. Stones that are 2 to 5 feet apart cover 3 to 15 percent of the surface. The areas of this unit are irregular in shape. They range from 10 to 75 acres, but most are about 20 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is 22 inches thick. The upper 3 inches is strong brown fine sandy loam, and the lower 19 inches is yellowish brown fine sandy loam and gravelly fine sandy loam. The substratum is grayish brown gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, less than 3 acres each, of Chatfield, Paxton, and Woodbridge soils. Also included are areas of soils that have more sand in the subsoil than this Canton soil and areas where stones cover less than 3 percent of the surface. Included areas make up about 15 percent of the unit.

The permeability of this Canton soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to moderately acid throughout the soil.

Slope and the stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture.

Maintaining a plant cover and using crop residue, conservation tillage, contour farming, and stripcropping are practices that help to reduce erosion in cultivated areas.

Most areas of this soil are covered with trees, and the soil is suited to trees. The stones on the surface limit the use of some types of equipment.

Slope is the main limitation of this soil as a site for dwellings, local roads and streets, and septic tank absorption fields. Stone removal is needed in some areas. Special design, retaining walls, and grading and filling are needed in some areas to overcome the slope. The sides of excavations in this soil are unstable, and the steeper sides commonly collapse. Thus, some form of shoring is needed. Placing roads and streets on the contour will help to avoid steep cuts, on which plant cover is difficult to maintain. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water pollution.

Capability subclass: VIIs.

CcE—Canton fine sandy loam, 25 to 35 percent slopes, extremely stony. This soil is very deep, steep, and well drained. It is on the sides of hills and the tops of ridges. Stones that are 2 to 5 feet apart cover 3 to 15 percent of the surface. The areas of this unit are long and narrow or irregular in shape. They range from 10 to 80 acres, but most are about 20 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is 22 inches thick. The upper 3 inches is strong brown fine sandy loam, and the lower 19 inches is yellowish brown fine sandy loam and gravelly fine sandy loam. The substratum is grayish brown gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, less than 3 acres each, of Chatfield, Paxton, and Woodbridge soils. Also included are areas of soils that have more sand in the subsoil than this Canton soil and areas where stones cover less than 3 percent of the surface. Included areas make up about 20 percent of the unit.

The permeability of this Canton soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to moderately acid throughout the soil.

Slope and the stones on the surface make this soil poorly suited to cultivated crops, hay, and pasture. The soil is suited to trees, and most areas are wooded. The stones and slope limit the use of some types of equipment.

Slope and the stones on the surface are major limitations of this soil as a site for dwellings and septic tank absorption fields and nearly preclude use of the soil as a site for local roads and streets. Special design, retaining walls, and grading and filling are needed for some building sites. The sides of excavations in this soil are unstable, and the steeper sides commonly collapse. Thus, shoring is needed in deep cuts. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: VIIs.

ChC—Chatfield-Hollis-Rock outcrop complex, 3 to 15 percent slopes. This unit consists of well drained to somewhat excessively drained soils on hills and ridges. Stones that are 5 to 30 feet apart cover less than 1 percent to 3 percent of the surface. The areas of this unit are irregular in shape. They range from 10 to 100 acres, but most are about 20 acres. This unit consists of 45 percent moderately deep Chatfield soils, 25 percent shallow Hollis soils, 15 percent Rock outcrop, and 15 percent other soils. The Chatfield and Hollis soils and Rock outcrop are so intermingled that it was not practical to map them separately.

Typically, the Chatfield soils have a surface layer of very dark grayish brown fine sandy loam about 3 inches thick. The subsoil is fine sandy loam 27 inches thick. The upper 5 inches of the subsoil is yellowish brown, the next 16 inches is light olive brown, and the lower 6 inches is light yellowish brown. Bedrock is at a depth of 30 inches.

Typically, the Hollis soils have a surface layer of very dark brown and brown fine sandy loam about 4 inches thick. The subsoil is 13 inches thick. The upper 8 inches is dark brown and yellowish brown fine sandy loam, and the lower 5 inches is yellowish brown gravelly fine sandy loam. Bedrock is at a depth of 17 inches.

Included with this unit in mapping are small areas, less than 3 acres each, of Canton, Paxton, and Woodbridge soils. Also included are areas where stones cover more than 3 percent of the surface.

The permeability in these Chatfield and Hollis soils is moderate or moderately rapid throughout. Available water capacity is moderate in the Chatfield soils and very low in the Hollis soils. Reaction in both soils ranges from very strongly acid through moderately acid. The depth to bedrock ranges from 20 to 40 inches in the Chatfield soils and 10 to 20 inches in the Hollis soils.

Most areas of these soils are covered with trees. Some areas are in pasture, and a few areas are used for cropland or residential development.

The stones on the surface, slope, the areas of rock outcrop, and the depth to bedrock make this unit poorly suited to farming. The unit is suited to trees. The stones and rock outcrop on the surface limit the use of some types of equipment, and the very low available water capacity of the Hollis soils causes a high rate of seedling mortality.

The rock outcrop and the depth to bedrock limit the use of these soils as a site for dwellings or local roads

and streets, and the depth to rock is a limitation of the unit as a site for septic tank absorption fields.

Capability subclass: VIs.

ChD—Chatfield-Hollis-Rock outcrop complex, 15 to 25 percent slopes. This unit consists of well drained to somewhat excessively drained soils on hills and ridges (fig. 4). Stones that are 2 to 5 feet apart cover 3 to 15 percent of the surface. The areas of this unit are irregular in shape. They range from 10 to 150 acres, but most are about 40 acres. This unit consists of 40 percent moderately deep Chatfield soils, 25 percent shallow Hollis soils, 20 percent Rock outcrop, and 15 percent other soils. The Chatfield and Hollis soils and Rock outcrop are so intermingled that it was not practical to map them separately.

Typically, the Chatfield soils have a surface layer of very dark grayish brown fine sandy loam about 3 inches thick. The subsoil is fine sandy loam 27 inches thick. The upper 5 inches of the subsoil is yellowish brown, the next 16 inches is light olive brown, and the lower 6 inches is light yellowish brown. Bedrock is at a depth of 30 inches.

Typically, the Hollis soils have a surface layer of very dark brown and brown fine sandy loam about 4 inches thick. The subsoil is 13 inches thick. The upper 8 inches is dark brown and yellowish brown fine sandy loam, and the lower 5 inches is yellowish brown gravelly fine sandy loam. Bedrock is at a depth of 17 inches.

Included in mapping are small areas, less than 3 acres each, of Canton, Paxton, and Woodbridge soils. Also included are areas of soils that have sandy subsoil and areas where stones cover less than 3 percent of the surface.

The permeability in these Chatfield and Hollis soils is moderate or moderately rapid throughout. Available water capacity is moderate in the Chatfield soils and very low in the Hollis soils. Reaction in both soils ranges from very strongly acid through moderately acid. The depth to bedrock ranges from 20 to 40 inches in the Chatfield soils and 10 to 20 inches in the Hollis soils.

The stones on the surface, slope, the areas of rock outcrop, and the depth to bedrock make this unit poorly suited to farming. The unit is suited to trees, and most areas are wooded. The stones and rock outcrop on the surface limit the use of some types of equipment, and the very low available water capacity of the Hollis soils causes a high rate of seedling mortality.

The rock outcrop, slope, and depth to bedrock are the main limitations of the unit as a site for dwellings and local roads and streets. Slope and the depth to bedrock also limit the unit as a site for septic tank absorption fields.

Capability subclass: VIIs.

De—Deerfield sandy loam. This soil is very deep, nearly level, and moderately well drained. It is on flats and in slight depressions. The areas of this unit are long and narrow or irregular in shape. They range from 5 to 50 acres, but most are about 10 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is black sandy loam about 2 inches thick. The subsoil is about 22 inches thick. The upper 6 inches of the subsoil is dark brown sandy loam, and the lower 16 inches is strong brown and yellowish brown loamy fine sand. The substratum extends to a depth of 60 inches or more. It is light brownish gray and light olive gray fine sand.

Included with this soil in mapping are small areas, less than 3 acres each, of Windsor soils. Also included are areas that have more silt in the surface layer and subsoil than this Deerfield soil and areas of Deerfield soils with slopes of 3 to 8 percent. Included soils make up about 20 percent of this unit.

The permeability of this Deerfield soil is rapid in the subsoil and very rapid in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to medium acid throughout the soil. The root zone is restricted by a seasonal high water table at a depth of 1 foot to 3 feet.

Most areas of this soil are wooded. Some are used for building sites, and a few areas are used for cropland.

This soil is suited to cultivated crops, hay, and improved pasture. The available water capacity is the main limitation of the soil for crops. Irrigating, adding organic matter, and using cover crops are practices that help to increase the suitability of the soil for farming. The seasonal high water table limits the use of equipment and restricts the root zone of some types of plants.

This soil is suited to trees, but the available water capacity causes a high rate of seedling mortality and makes drought-tolerant species more suitable.

The seasonal high water table is the main limitation of this soil as a site for dwellings and septic tank absorption fields, and makes drainage necessary in some areas. The soil is suitable as a site for local roads and streets, but the sides of excavations are unstable and the steeper sides commonly collapse. The soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IIIw.

Fm—Freetown muck. This soil is very deep, nearly level, and very poorly drained. It is in depressional areas and old glacial lakes. The areas of this unit are irregular in shape. They range from 5 to 250 acres, but most are about 20 acres. Slopes range from 0 to 2 percent.

Typically, the soil consists of black and dark reddish brown layers of highly decomposed organic material to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Scarboro, Swansea,

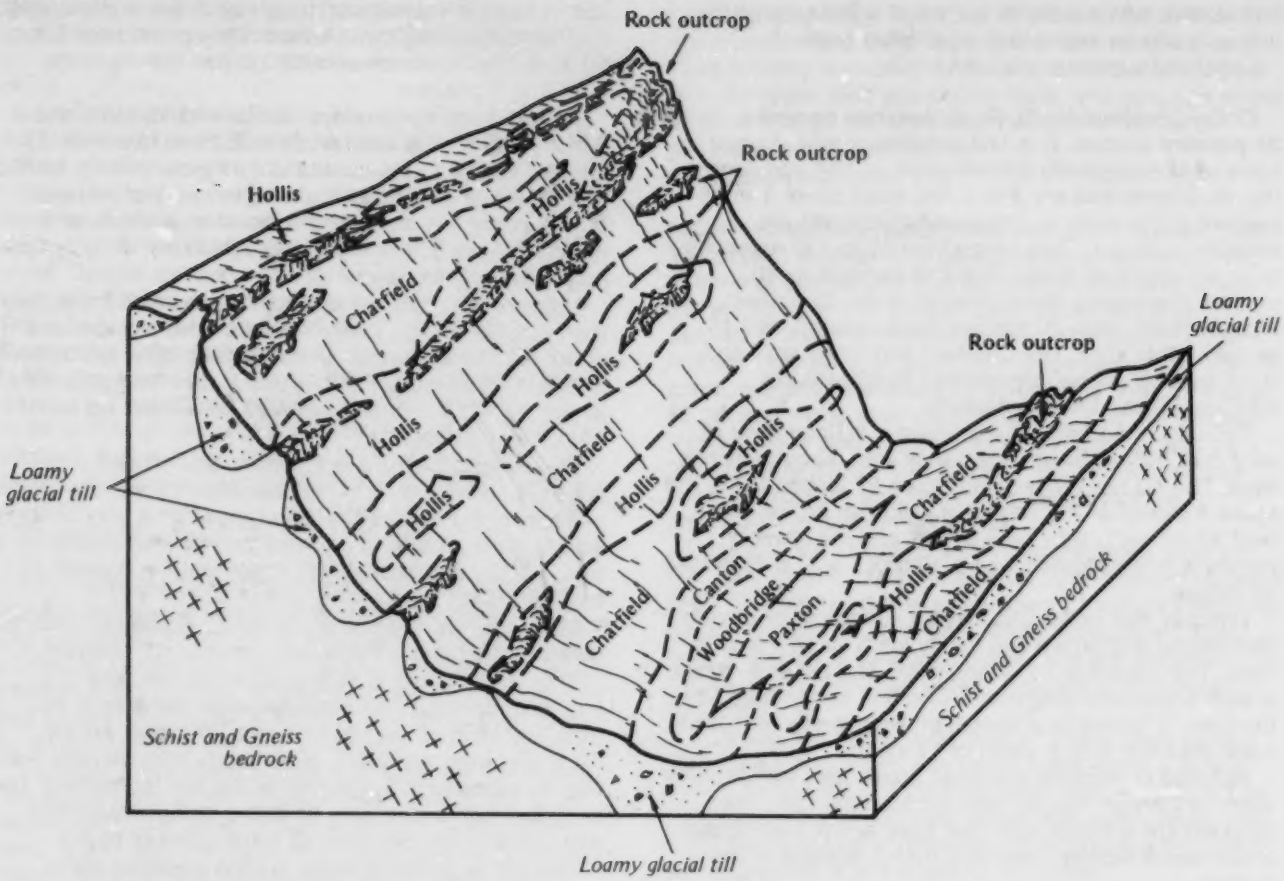


Figure. 4—Typical pattern of soils and underlying material in the Chatfield-Hollis-Rock outcrop complex, 15 to 25 percent slopes.

Saco, and Walpole soils. Included areas make up about 25 percent of this unit.

The permeability of this Freetown soil is moderate in the upper part and moderately rapid in the lower part. Available water capacitv is high. Reaction is extremely acid throughout the soil. The root zone is restricted by a high water table between the surface and a depth of 1 foot.

Most areas of this soil are covered with water-tolerant shrubs and tree species.

The high water table makes this soil poorly suited to farming and woodland. Drained and limed areas, however, are suitable for vegetables and hay. The high water table restricts rooting, making trees susceptible to uprooting during windy periods, and it causes a high rate of seedling mortality and limits the use of equipment.

The water table and low strength limit the soil as a site for dwellings and local roads and streets. The water table further limits the soil as a site for septic tank absorption fields and makes ground-water contamination a hazard in areas used as sites for septic tanks.

Capability subclass: Vw.

Fp—Freetown muck, ponded. This soil is very deep, nearly level, and very poorly drained. It is in depressional areas and old glacial lakes covered with up to 2 feet of water. The areas of this unit are irregular in shape. They range from 5 to 100 acres, but most are 10 acres. Slopes range from 0 to 1 percent.

Typically, the soil consists of black and dark reddish brown layers of highly decomposed organic material to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Saco, Scarboro, and Swansea soils. Included areas make up about 20 percent of this unit.

The permeability of this Freetown soil is moderate to moderately rapid. Available water capacity is high.

Reaction is extremely acid throughout the soil. The root zone is restricted by water at or on the surface.

The water on the surface of this soil is a major limitation for most uses, including farming, woodland, and community development. A few areas are used for wildlife habitat, and some areas are covered by low-quality, water-tolerant shrubs.

Capability subclass: VIIw.

HaA—Hadley very fine sandy loam. This soil is very deep, nearly level, and well drained. It is on flood plains. The areas of this unit are irregular in shape. They range from 5 to 100 acres, but most are about 10 acres.

Typically, the surface layer is very dark grayish brown very fine sandy loam about 8 inches thick. The substratum is light olive brown and olive very fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Winooski soils. Also included are areas of Suncook soils and areas that are sand, fine sandy loam, or sandy loam throughout. included areas make up about 15 percent of this unit.

The permeability of this Hadley soil is moderate or moderately rapid throughout. Available water capacity is high. Reaction ranges from very strongly acid through mildly alkaline throughout.

Most areas of this soil are used for crops. A few areas are in native vegetation.

This soil is well suited to cultivated crops, hay, pasture, and trees. Occasional, brief flooding is a limitation, but protected areas are suitable for farming.

Flooding also is the main limitation of this soil as a site for dwellings, local roads and streets, and septic tank absorption fields.

Capability class: I.

HgA—Hinckley sandy loam, 0 to 3 percent slopes. This soil is very deep, nearly level, and excessively drained. It is on broad areas on outwash plains. The areas of this unit are irregular in shape. They range from 5 to 80 acres, but most are about 10 acres.

Typically, the surface layer is very dark grayish brown sandy loam about 3 inches thick. The subsoil is yellowish brown and is 18 inches thick. The upper 9 inches is gravelly loamy sand, and the lower 9 inches is gravelly sand. The substratum is light olive brown stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Deerfield, Merrimac, and Windsor soils. Included areas make up about 20 percent of the unit.

The permeability of this Hinckley soil is rapid in the subsoil and very rapid in the substratum. Available water capacity is low. Reaction ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are in brushland. Some are used for building sites, and a few areas are covered with trees.

This soil is suited to cultivated crops, hay, and pasture. Droughtiness and a low nutrient content are the main limitations for cultivated crops. Irrigating, fertilizing, using cover crops, and mixing crop residue and manure into the plow layer are practices that help to improve the suitability of the soil for crops. Droughtiness and the low nutrient content are concerns but not major limitations of the soil for hay and pasture. The major pasture management concern is the prevention of overgrazing.

This soil is poorly suited to trees. The droughtiness and low nutrient content cause a high seedling mortality rate.

This soil has essentially no limitations as a site for dwellings or local roads and streets. The sides of excavations in this soil are unstable, however, and steep sides commonly collapse. Thus, some form of shoring is needed in deep cuts. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IIIs.

HgB—Hinckley sandy loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and excessively drained. It is on rolling areas on outwash plains. The areas of this unit are irregular in shape. They range from 10 to 150 acres, but most areas are about 20 acres.

Typically, the surface layer is very dark grayish brown sandy loam about 3 inches thick. The subsoil is yellowish brown and is 18 inches thick. The upper 9 inches is gravelly loamy sand, and the lower 9 inches is gravelly sand. The substratum is light olive brown stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Deerfield, Merrimac, and Windsor soils. Included areas make up about 20 percent of the unit.

The permeability of this Hinckley soil is rapid in the subsoil and very rapid in the substratum. Available water capacity is low. Reaction ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are in brushland. Some are used for building sites, and a few areas are covered with trees.

This soil is suited to cultivated crops, hay, and pasture. Erosion, droughtiness, and a low nutrient content are the main limitations for cultivated crops. Fertilizing, using cover crops, and mixing crop residue and manure into the plow layer are practices that help to improve the suitability of the soil for crops. Droughtiness and low nutrient content are concerns but not major limitations for hay and pasture.

This soil is poorly suited to trees. The droughtiness and low nutrient content cause a high seedling mortality rate.

This soil has essentially no limitations as a site for dwellings or local roads and streets. The sides of excavations in this soil are unstable, however, and steep sides commonly collapse. Thus, some form of shoring is needed in deep cuts. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IIIs.

HgC—Hinckley sandy loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and excessively drained. It is on the sides of kames and on the side slopes of flat outwash plains. The areas of this unit are long and narrow or irregular in shape. They range from 5 to 100 acres, but most are about 20 acres.

Typically, the surface layer is very dark grayish brown sandy loam about 3 inches thick. The subsoil is yellowish brown and is 18 inches thick. The upper 9 inches is gravelly loamy sand, and the lower 9 inches is gravelly sand. The substratum is light olive brown stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Merrimac and Windsor soils. Included areas make up about 20 percent of the unit.

The permeability of this Hinckley soil is rapid in the subsoil and very rapid in the substratum. Available water capacity is low. Reaction ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are in brushland. Some are used for building sites, and a few areas are covered with trees.

This soil is suited to cultivated crops, hay, and pasture. Erosion, droughtiness, and a low nutrient content are the main limitations for cultivated crops. Fertilizing, using cover crops, and mixing crop residue and manure into the plow layer are practices that help to improve the suitability of the soil for crops. Droughtiness and the low nutrient content are concerns but not major limitations for hay and pasture.

This soil is poorly suited to trees. The droughtiness and low nutrient content cause a high seedling mortality rate.

Slope is the main limitation of this soil as a site for buildings and local roads and streets. The sides of excavations in this soil are unstable, and the steeper sides commonly collapse. Thus, some form of shoring is needed when deep cuts are made. Placing roads on the contour of the landscape helps to avoid steep excavations, on which plant cover is difficult to establish. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IVs.

HgD—Hinckley sandy loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and excessively drained. It is on ridges on outwash plains. The areas of this unit are irregular in shape. They range from 10 to 70 acres, but most are about 15 acres.

Typically, the surface layer is very dark grayish brown sandy loam about 3 inches thick. The subsoil is yellowish brown and is 18 inches thick. The upper 9 inches is gravelly loamy sand, and the lower 9 inches is gravelly sand. The substratum is light olive brown stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Merrimac and Windsor soils. Included areas make up about 20 percent of the unit.

The permeability of this Hinckley soil is rapid in the subsoil and very rapid in the substratum. Available water capacity is low. Reaction ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are in brushland. Some areas are covered with trees.

Droughtiness, erosion, and a low nutrient content make this soil poorly suited to farming. Stripcropping, using cover crops, and mixing crop residue and manure into the plow layer help to control erosion in cultivated areas.

This soil is poorly suited to trees. The droughtiness and low nutrient content cause a high seedling mortality rate.

Slope is the major limitation of this soil as a site for dwellings and local roads and streets. The sides of excavations in this soil are unstable, and the steeper sides commonly collapse. Thus, some form of shoring is needed. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: VIs.

HgE—Hinckley sandy loam, 25 to 35 percent slopes. This soil is deep, steep, and excessively drained. It is on ridges of eskers. The areas of this unit are irregular in shape. They range from 5 to 40 acres, but most are about 10 acres.

Typically, the surface layer is very dark grayish brown sandy loam about 3 inches thick. The subsoil is yellowish brown and is 18 inches thick. The upper 9 inches is gravelly loamy sand, and the lower 9 inches is gravelly sand. The substratum is light olive brown stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres, of Windsor soils and soils where stones cover 1 to 3 percent of the surface.

The permeability of this Hinckley soil is rapid in the subsoil and very rapid in the substratum. Available water

capacity is low. Reaction ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are in brushland. Some areas are covered with trees.

Droughtiness, slope, and a low nutrient content make this soil poorly suited to farming and woodland. The droughtiness and low nutrient content cause a high seedling mortality rate, and the slope limits the use of some types of woodland equipment.

Slope is the major limitation of this soil as a site for dwellings and local roads and streets. The sides of excavations in this soil are unstable, and the steeper sides commonly collapse. Thus, some form of shoring is needed. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: VIIs.

HkB—Hinckley sandy loam, 3 to 8 percent slopes, very stony. This soil is very deep, gently sloping, and excessively drained. It is on rolling areas on outwash plains. Stones that are 5 to 30 feet apart cover from less than 1 percent to 3 percent of the surface. The areas of this unit are irregular in shape. They range from 5 to 20 acres, but most areas are about 10 acres.

Typically, the surface layer is very dark grayish brown sandy loam about 3 inches thick. The subsoil is yellowish brown and is 18 inches thick. The upper 9 inches is gravelly loamy sand, and the lower 9 inches is gravelly sand. The substratum is light olive brown stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Canton, Merrimac, and Windsor soils. Included areas make up about 15 percent of the unit.

The permeability of this Hinckley soil is rapid in the subsoil and very rapid in the substratum. Available water capacity is low. Reaction ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are in brushland. Some areas are covered with trees, and some are used for commercial and residential development.

Droughtiness, the stones on the surface, and a low nutrient content make this soil poorly suited to cultivated crops, hay, and improved pasture. Fertilizing, using cover crops, and mixing crop residue and manure into the plow layer are practices that help to improve the suitability of the soil for crops.

This soil is poorly suited to trees. Droughtiness and the low nutrient content cause a high seedling mortality rate.

This soil has essentially no limitations as a site for dwellings or local roads and streets. The sides of excavations in this soil are unstable, however, and steep sides commonly collapse. Thus, some form of shoring is needed in deep cuts. This soil is a poor filter for septic tank absorption fields and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: VIs.

HkC—Hinckley sandy loam, 8 to 15 percent slopes, very stony. This soil is very deep, strongly sloping, and excessively drained. It is on the sides of terraces, kames, and outwash plains. Stones that are 5 to 30 feet apart cover from less than 1 percent to 3 percent of the surface. The areas of this unit are irregular in shape. They range from 5 to 15 acres, but most areas are about 10 acres.

Typically, the surface layer is very dark grayish brown sandy loam about 3 inches thick. The subsoil is yellowish brown and is 18 inches thick. The upper 9 inches is gravelly loamy sand, and the lower 9 inches is gravelly sand. The substratum is light olive brown stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Canton, Merrimac, and Windsor soils. Also included are areas of Hinckley soils with slopes of 15 to 25 percent. Included areas make up about 20 percent of the unit.

The permeability of this Hinckley soil is rapid in the subsoil and very rapid in the substratum. Available water capacity is low. Reaction ranges from extremely acid to moderately acid throughout the soil.

Most areas of this soil are in brushland. Some areas are covered with trees, and some are used for urban development.

Droughtiness, the stones on the surface, slope, and a low nutrient content make this soil poorly suited to cultivated crops, hay, and improved pasture. Erosion is a hazard. Fertilizing, using cover crops, and mixing crop residue and manure into the plow layer are practices that help to improve the suitability of the soil for crops.

This soil is poorly suited to trees. Droughtiness and the low nutrient content cause a high seedling mortality rate.

This soil has essentially no limitations as a site for dwellings or local roads and streets. The sides of excavations in this soil are unstable, however, and steep sides commonly collapse. Thus, some form of shoring is needed in deep cuts. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: VIs.

HuC—Hinckley-Urban land complex, 0 to 15 percent slopes. This unit is on outwash plains. It consists of very deep, nearly level to strongly sloping, excessively drained soils and areas that have been altered by filling or grading for buildings, parking lots, and other urban structures. The areas of the unit are rectangular or irregularly shaped and range from 10 to

100 acres, but most are about 30 acres. The areas consist of about 45 percent Hinckley soils, 35 percent urbanized areas, and 20 percent other soils. The Hinckley soils and urbanized areas are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Hinckley soils is very dark grayish brown sandy loam about 3 inches thick. The subsoil is yellowish brown and is 18 inches thick. The upper 9 inches is gravelly loamy sand, and the lower 9 inches is gravelly sand. The substratum is light olive brown stratified sand and gravel to a depth of 60 inches or more.

Included with this unit in mapping are small areas of Udorthents and Agawam, Merrimac, and Windsor soils. Also included are soils with slopes of more than 15 percent and moderately well drained soils.

The permeability of these Hinckley soils is rapid in the subsoil and very rapid in the substratum. Available water capacity is low. Reaction ranges from extremely acid to moderately acid throughout the soil.

Most areas of this unit are used for residential and commercial use. A few areas are in native vegetation.

The lack of open space is the major limitation of this unit for cultivated crops or woodland, and the Hinckley soils are droughty and have a low content of nutrients. The unit is generally suitable as a site for dwellings and local roads and streets, but the sides of excavations in the Hinckley soils are unstable and the steeper sides commonly collapse. The Hinckley soils are a poor filter for septic tank absorption fields. Seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: not assigned.

HwB—Hinesburg loamy sand, 3 to 8 percent slopes. This soil is very deep, gently sloping, and well drained. It is on broad areas and old lakebeds. The areas of this unit are irregular in shape. They range from 5 to 40 acres, but most are about 10 acres.

Typically, the surface layer is very dark grayish brown loamy sand about 7 inches thick. The subsoil is 21 inches thick. The upper 11 inches is yellowish brown loamy sand, and the lower 10 inches is light yellowish brown fine sand. The upper 3 inches of the substratum is grayish brown fine sand. The lower part is olive silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Deerfield and Windsor soils. Also included are areas that have a surface layer and subsoil of silt loam, areas of soils with slopes of 0 to 3 percent, and areas of soils that are mottled in the subsoil. Included areas make up about 25 percent of the unit.

The permeability of this Hinesburg soil is rapid in the subsoil and moderately slow in the substratum. Available water capacity is low. Reaction ranges from moderately acid to slightly acid in the surface layer and subsoil and from strongly acid to neutral in the substratum.

Most areas of this soil are covered with trees or brush, and the soil is well suited to trees.

This soil is well suited to cultivated crops, hay, and improved pasture. The low available water capacity and a low content of nutrients are the main limitations for crops, and erosion is a hazard. Farming on the contour and using tillage methods that leave large amounts of crop residue on the surface are practices that help to control erosion in cultivated areas.

Low strength and a frost action potential are the main limitations of this soil as a site for buildings and local roads and streets. Compaction of the soil or using fill material will help to overcome the low strength and frost-action potential. The permeability of the substratum limits the soil as a site for septic tank absorption fields.

Capability subclass: IIs.

Lm—Limerick silt loam. This soil is very deep, nearly level, and poorly drained. It is on flood plains. The areas of this unit are irregular in shape. They range from 5 to 30 acres, but most are about 15 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark grayish brown silt loam about 9 inches thick. The substratum is olive gray and extends to a depth of 60 inches or more. It is silt loam in the upper part and very fine sandy loam in the lower part.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Saco and Winooski soils. Also included are areas of soils that are more sandy than this Limerick soil. Included areas make up about 20 percent of the unit.

The permeability of this Limerick soil is moderate throughout. Available water capacity is high. Reaction ranges from strongly acid to neutral to a depth of 40 inches and from moderately acid to neutral below a depth of 40 inches. The seasonal high water table is at a depth of 6 to 18 inches.

This soil is suited to cultivated crops, hay, and improved pasture, and some areas are farmed. The main limitations for farming are frequent, brief flooding and the seasonal high water table.

Flooding and the seasonal high water table make this soil poorly suited to trees. They limit the use of equipment, cause a high rate of seedling mortality, and restrict rooting. They also are the main limitations for most types of urban development.

Capability subclass: IIIw.

MeA—Merrimac fine sandy loam, 0 to 3 percent slopes. This soil is very deep, nearly level, and somewhat excessively drained. It is on broad areas on outwash plains. The areas of this unit are long and narrow or irregular in shape. They range from 5 to 80 acres, but most are about 15 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 2 inches thick. The subsoil is 22 inches thick. The upper 13 inches is yellowish brown fine sandy loam, and the lower 9 inches is a light olive brown gravelly sandy loam. The substratum is light yellowish brown stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Hinckley, Sudbury, and Windsor soils. Also included are areas of soils with a surface layer of sandy loam. Included areas make up about 15 percent of this unit.

The permeability of this Merrimac soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to moderately acid.

Most areas of this soil are used for cropland. Some areas are used for building sites.

This soil is well suited to cultivated crops, hay, and improved pasture. Droughtiness is a limitation. Using irrigation and increasing the organic matter content of the soil are the main farming management concerns. Use of proper stocking rates and deferred and rotational grazing are pasture management practices that help to maintain desirable plant species.

This soil is well suited to trees. The available water capacity causes a moderate rate of seedling mortality. Mulching and increasing the organic matter content of the soil are practices that help to increase the moisture content of the soil.

This soil has essentially no major limitations as a site for dwellings and local roads and streets. The sides of excavations in this soil are unstable, however, and the steeper sides commonly collapse, making some form of shoring necessary in steep cuts. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IIs.

MeB—Merrimac fine sandy loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and somewhat excessively drained. It is on broad areas on outwash plains. The areas of this unit are long and narrow or irregular in shape. They range from 10 to 160 acres, but most are about 20 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 2 inches thick. The subsoil is 22 inches thick. The upper 13 inches is yellowish brown fine sandy loam, and the lower 9 inches is light olive brown gravelly sandy loam. The substratum is light yellowish brown stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Hinckley, Sudbury, and Windsor soils. Also included are areas of soils with a surface layer of sandy loam. Included areas make up about 15 percent of this unit.

The permeability of this Merrimac soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to moderately acid.

Most areas of this soil are used for cropland (fig. 5). Some areas are used for building sites.

This soil is well suited to cultivated crops, hay, and improved pasture. Erosion is a hazard, and droughtiness is a limitation. Using irrigation and increasing the organic matter content of the soil are practices that help to increase the moisture content of this soil. Stripcropping, planting on the contour, and using conservation tillage help to reduce the hazard of erosion. Using proper stocking rates and deferred and rotational grazing are pasture management practices that help to maintain desirable plant species.

This soil is well suited to trees. The available water capacity causes a moderate rate of seedling mortality. Mulching and increasing the organic matter content of the soil are practices that help to increase the moisture content of the soil.

This soil has essentially no major limitations as a site for dwellings and local roads and streets. The sides of excavations in this soil are unstable, however, and the steeper sides commonly collapse, making some form of shoring necessary in steep cuts. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IIs.

MeC—Merrimac fine sandy loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and somewhat excessively drained. It is on the side slopes of ridges and the sides of broad areas on outwash plains. The areas of this unit are long and narrow or irregular in shape. They range from 10 to 100 acres, but most are about 15 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 2 inches thick. The subsoil is 22 inches thick. The upper 13 inches is yellowish brown fine sandy loam, and the lower 9 inches is a light olive brown gravelly sandy loam. The substratum is light yellowish brown stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Hinckley and Windsor soils. Also included are areas of soils with a surface layer of sandy loam. Included areas make up about 15 percent of this unit.

The permeability of this Merrimac soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to moderately acid.

Figure 5.—Corn in an area of Merrimac fine sandy loam, 3 to 8 percent slopes.

Most areas of this soil are used for cropland. Some areas are used for building sites.

This soil is suited to cultivated crops, hay, and improved pasture. Erosion is a hazard, and slope and droughtiness are the main limitations. Stripcropping, conservation tillage, and increasing the organic matter content of the soil are the main farming management practices. Using proper stocking rates and deferred and rotational grazing are pasture management practices that help to maintain desirable plant species.

This soil is well suited to trees. The available water capacity causes a moderate rate of seedling mortality. Mulching and increasing the organic matter content of the soil are practices that help to increase the moisture content of the soil.

Slope is the main limitation of this soil as a site for dwellings and local roads and streets. Using retaining walls, grading, and constructing roads and streets on the contour are ways of overcoming the slope. The sides of excavations in this soil are unstable, and the steeper sides commonly collapse, making some form of shoring necessary in steep cuts. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IIIe.

MeD—Merrimac fine sandy loam, 15 to 25 percent slopes. This soil is very deep, moderately steep, and somewhat excessively drained. It is on ridges on outwash plains. The areas of this soil are long and narrow or irregular in shape. They range from 5 to 80 acres, but most are about 10 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 2 inches thick. The subsoil is 22 inches thick. The upper 13 inches is yellowish brown fine sandy loam, and the lower 9 inches is a light olive brown gravelly sandy loam. The substratum is light yellowish brown stratified sand and gravel to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Hinckley and Windsor soils. Also included are areas of soils with a surface layer of sandy loam. Included areas make up about 15 percent of this unit.

The permeability of this Merrimac soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from extremely acid to moderately acid.

Most areas of this soil are covered with trees and brush.

This soil is suited to cultivated crops, hay, and improved pasture. Erosion is a hazard, and slope and droughtiness are the main limitations. Stripcropping, conservation tillage, and increasing the organic matter content of the soil are the main farming management practices. Using proper stocking rates and deferred and rotational grazing are pasture management practices that help to maintain desirable plant species.

This soil is well suited to trees. The available water capacity causes a moderate rate of seedling mortality. Mulching and increasing the organic matter content of the soil are practices that help to increase the moisture content of the soil.

Slope is the main limitation of this soil as a site for dwellings and local roads and streets. Using retaining walls, grading, and constructing roads and streets on the contour are ways of overcoming the slope. The sides of excavations in this soil are unstable, and the steeper sides commonly collapse, making some form of shoring necessary in steep cuts. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IVe.

NgA—Ninigret fine sandy loam, 0 to 3 percent slopes. This soil is very deep, nearly level, and moderately well drained. It is on broad areas on outwash plains. The areas of this unit are irregular in shape. They range from 5 to 40 acres, but most are about 10 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 9 inches thick. The subsoil is yellowish brown fine sandy loam 12 inches thick. The substratum is light olive brown and extends to a depth of 60 inches or more. It is loamy fine sand in the upper part and gravelly loamy sand in the lower part.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Agawam, Deerfield, Merrimac, and Windsor soils. Also included are areas of soils that have more silt in the surface layer and subsoil than this Ninigret soil and areas of soils with slopes of 3 to 8 percent. Included areas make up about 15 percent of the unit.

The permeability of this Ninigret soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is moderate. Reaction ranges from moderately acid to very strongly acid throughout the soil. A seasonal high water table is at a depth of 1 1/2 to 3 feet.

Most areas of this soil are in cropland. Some areas have been developed for residential use.

This soil is well suited to cultivated crops, hay, and improved pasture and to woodland. Incorporating crop residue into the soil increases the organic matter content. The use of proper stocking rates and deferred and rotational grazing help to maintain the desirable pasture plant species.

The seasonal high water table during the winter and early spring is the main limitation of the soil as a site for dwellings or local roads and streets. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IIw.

PaB—Paxton fine sandy loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and well drained. It is on drumlins and drumlinlike areas. The areas of this soil are long and narrow or irregular in shape. They range from 5 to 50 acres, but most are about 15 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 5 inches thick. The subsoil is yellowish brown fine sandy loam about 22 inches thick. The substratum is very firm, grayish brown gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Canton and Woodbridge soils. Also included are areas that have stones on the surface, areas of soils that have more sand in the substratum than this Paxton soil, and areas of soils with slopes of 0 to 3 percent. Included areas make up about 15 percent of this unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is high. Reaction ranges from very strongly acid to moderately acid. A seasonal high water table is perched at a depth of 1 1/2 to 2 1/2 feet.

Most areas of this soil are used for cropland. Some have been developed for residential use. A few areas are covered with trees, and the soil is well suited to trees.

This soil is well suited to cultivated crops, hay, and improved pasture. Erosion is a hazard. Conservation tillage, using cover crops, and stripcropping help to reduce erosion.

The seasonal high water table and a frost-action potential are the main limitations of the soil as a site for dwellings or local roads and streets. The slow or very slow permeability of the substratum limits the use of this soil for septic tank absorption fields.

Capability subclass: IIe.

PaC—Paxton fine sandy loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on drumlins and drumlinlike areas. The areas of this unit are long and narrow or irregular in shape. They range from 5 to 50 acres, but most are about 10 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 5 inches thick. The subsoil is yellowish brown fine sandy loam about 22 inches thick. The substratum is very firm, grayish brown gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Canton and Woodbridge soils. Also included are stony areas. Included areas make up about 15 percent of this unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is high. Reaction ranges from very strongly acid to moderately acid. A seasonal high water table is perched at a depth of 1 1/2 to 2 1/2 feet.

Most areas of this soil are covered with trees, and the soil is well suited to trees. Some areas have been developed for residential use, and a few areas are used for cropland.

This soil is suited to cultivated crops, hay, and improved pasture. Slope is the major limitation, and erosion is a hazard. Conservation tillage, using cover crops, and stripcropping help to reduce erosion in cultivated areas.

Slope, the seasonal high water table, and a frost-action potential are the main limitations of this soil as a site for dwellings and local roads and streets. The slow or very slow permeability of the substratum is a limitation of the soil for septic tank absorption fields.

Capability subclass: IIIe.

PaD—Paxton fine sandy loam, 15 to 25 percent slopes. This soil is deep, moderately steep, and well drained. It is on drumlins. The areas of this soil are long and narrow or irregular in shape. They range from 5 to 80 acres, but most are about 10 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 5 inches thick. The subsoil is yellowish brown fine sandy loam about 22 inches thick. The substratum is very firm, grayish brown gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Canton and Woodbridge soils. Also included are areas that have stones on the surface and areas that have more sand in the substratum than this Paxton soil. Included areas make up about 15 percent of this unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is high. Reaction ranges from very strongly acid to moderately acid. A seasonal high water table is perched at a depth of 1 1/2 to 2 1/2 feet.

Most areas of this soil are covered with trees or are in pasture.

This soil is suited to cultivated crops, hay, and improved pasture. Slope is the major limitation and erosion is a hazard. Conservation tillage, using cover crops, and stripcropping help to reduce erosion.

This soil is well suited to growing trees. Slope limits the use of some types of equipment.

Slope is the major limitation of this soil as a site for dwellings or local roads and streets. The slow or very slow permeability in the substratum limits the use of this soil for septic tank absorption fields.

Capability subclass: IVe.

PbB—Paxton fine sandy loam, 3 to 8 percent slopes, very stony. This soil is very deep, gently sloping, and well drained. It is on drumlins and drumlinlike areas. Stones that are 5 to 30 feet apart cover from less than 1 percent to 3 percent of the surface. The areas of this soil are irregular in shape. They range from 5 to 80 acres, but most are about 20 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 5 inches thick. The subsoil is yellowish brown fine sandy loam about 22 inches thick. The substratum is very firm, grayish brown gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Canton and Woodbridge soils. Also included are areas that have more sand in the substratum than this Paxton soil and areas of soils with slopes of 0 to 3 percent. Included areas make up about 15 percent of this unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is high. Reaction ranges from very strongly acid to moderately acid. A seasonal high water table is perched at a depth of 1 1/2 to 2 1/2 feet.

Most areas of this soil are covered with trees, and the soil is well suited to trees. Some areas are used for pasture, and a few areas are used for residential development.

The stones on the surface and an erosion hazard make this soil poorly suited to cultivated crops, hay, and improved pasture. The soil is well suited to these uses if the stones are removed. Conservation tillage, cover crops, and stripcropping help to reduce erosion in cultivated areas.

The seasonal high water table and a frost-action potential are the main limitations of the soil as a site for

dwellings or local roads and streets. The slow or very slow permeability and the firmness of the substratum limit the use of this soil for septic tank absorption fields.

Capability subclass: VIs.

PbC—Paxton fine sandy loam, 8 to 15 percent slopes, very stony. This soil is very deep, strongly sloping, and well drained. It is on drumlins and drumlinlike areas. Stones that are 5 to 30 feet apart cover from less than 1 percent to 3 percent of the surface. The areas of this soil are irregular in shape. They range from 5 to 50 acres, but most are about 10 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 5 inches thick. The subsoil is yellowish brown fine sandy loam about 22 inches thick. The substratum is very firm, grayish brown gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Canton and Woodbridge soils. Also included are areas that have more sand in the substratum than this Paxton soil and areas of soils with slopes of 3 to 8 percent. Included areas make up about 15 percent of this unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is high. Reaction ranges from very strongly acid to moderately acid. A seasonal high water table is perched at a depth of 1 1/2 to 2 1/2 feet.

Most areas of this soil are covered with trees, and the soil is well suited to trees. Some areas are used for pasture.

The stones on the surface and an erosion hazard make this soil poorly suited to cultivated crops, hay, and improved pasture. Conservation tillage, cover crops, and stripcropping help to reduce erosion in cultivated areas.

The seasonal high water table and a frost-action potential are the main limitations of the soil as a site for dwellings or local roads and streets. The slow or very slow permeability and the firmness of the substratum limit the use of this soil for septic tank absorption fields.

Capability subclass: VIs.

PbD—Paxton fine sandy loam, 15 to 25 percent slopes, very stony. This soil is very deep, moderately steep, and well drained. It is on drumlins. Stones that are 5 to 30 feet apart cover from less than 1 percent to 3 percent of the surface. The areas of this unit are long and narrow or irregular in shape. They range from 5 to 100 acres, but most are about 25 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 5 inches thick. The subsoil is yellowish brown fine sandy loam about 22 inches thick. The substratum is very firm, grayish brown gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Canton and Woodbridge soils. Also included are areas that have more sand in the substratum than this Paxton soil and areas of soils with slopes of 8 to 15 percent. Included areas make up about 15 percent of this unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is high. Reaction ranges from very strongly acid to moderately acid. A seasonal high water table is perched at a depth of 1 1/2 to 2 1/2 feet.

Most areas of this soil are covered with trees. A few areas are used for pasture.

The stones on the surface and an erosion hazard make this soil poorly suited to cultivated crops, hay, and improved pasture. Conservation tillage, cover crops, and stripcropping help to reduce erosion in cultivated areas.

This soil is well suited to trees. Slope limits the use of some types of equipment.

Slope, the seasonal high water table, and a frost-action potential are the main limitations of this soil as a site for dwellings or local roads and streets. The slow or very slow permeability in the substratum limits the use of this soil for septic tank absorption fields.

Capability subclass: VIs.

PcB—Paxton fine sandy loam, 3 to 8 percent slopes, extremely stony. This soil is very deep, gently sloping, and well drained. It is on drumlins and drumlinlike areas. Stones that are 2 to 5 feet apart cover from 3 to 15 percent of the surface. The areas of this soil are irregular in shape. They range from 15 to 150 acres, but most are about 50 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 5 inches thick. The subsoil is yellowish brown fine sandy loam about 22 inches thick. The substratum is very firm, grayish brown gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Canton and Woodbridge soils. Also included are areas of soils that have more sand in the substratum than this Paxton soil, areas where stones cover less than 3 percent of the surface, and areas of Paxton soils with slopes of 0 to 3 percent. Included areas make up about 15 percent of this unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is high. Reaction ranges from very strongly acid to moderately acid. A seasonal high water table is perched at a depth of 1 1/2 to 2 1/2 feet.

Most areas of this soil are covered with trees. A few areas are used for pasture.

The stones on the surface and an erosion hazard make this soil poorly suited to cultivated crops, hay, and improved pasture. The soil is well suited to these uses if the stones are removed. Conservation tillage, cover crops, and stripcropping help to reduce erosion in cultivated areas.

This soil is well suited to trees. The stones on the surface limit the use of some types of equipment.

The seasonal high water table and a frost-action potential are the main limitations of the soil as a site for dwellings or local roads and streets. The slow or very slow permeability of the substratum limits the use of this soil for septic tank absorption fields.

Capability subclass: VIIs.

PcC—Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony. This soil is very deep, strongly sloping, and well drained. It is on drumlins and drumlinlike areas. Stones that are 2 to 5 feet apart cover from 3 to 15 percent of the surface. The areas of this unit are irregular in shape. They range from 5 to 100 acres, but most are about 25 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 5 inches thick. The subsoil is yellowish brown fine sandy loam about 22 inches thick. The substratum is very firm, grayish brown gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Canton and Woodbridge soils. Also included are areas where stones cover less than 3 percent of the surface and areas of soils that have more sand in the substratum than this Paxton soil. Included areas make up about 15 percent of this unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is high. Reaction ranges from very strongly acid to moderately acid. A seasonal high water table is perched at a depth of 1 1/2 to 2 1/2 feet.

The stones on the surface and an erosion hazard make this soil poorly suited to cultivated crops, hay, and improved pasture. Conservation tillage, cover crops, and stripcropping help to reduce erosion in cultivated areas.

This soil is well suited to trees, and most areas are wooded. The stones on the surface limit the use of some types of equipment.

The seasonal high water table and a frost-action potential are the main limitations of the soil as a site for dwellings or local roads and streets. The slow or very slow permeability of the substratum limits the use of this soil for septic tank absorption fields.

Capability subclass: VIIs.

PcD—Paxton fine sandy loam, 15 to 25 percent slopes, extremely stony. This soil is very deep, moderately steep, and well drained. It is on drumlins. Stones that are 2 to 5 feet apart cover from 3 to 15 percent of the surface. The areas of this unit are long and narrow or irregular in shape. They range from 10 to 80 acres, but most are about 40 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 5 inches thick. The subsoil is yellowish brown fine sandy loam about 22 inches thick. The substratum is very firm, grayish brown gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Canton and Chatfield soils. Also included are areas of soils that have more sand in the substratum than this Paxton soil and areas where stones cover less than 3 percent of the surface. Included areas make up about 15 percent of this unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is high. Reaction ranges from very strongly acid to moderately acid. A seasonal high water table is perched at a depth of 1 1/2 to 2 1/2 feet.

The stones on the surface and an erosion hazard make this soil poorly suited to cultivated crops, hay, and improved pasture. Conservation tillage, cover crops, and stripcropping help to reduce erosion in cultivated areas.

This soil is well suited to trees, and most areas are wooded. Slope and the stones on the surface limit the use of some types of equipment.

Slope, the seasonal high water table, and a frost-action potential are the main limitations of this soil as a site for dwellings or local roads and streets. The slow or very slow permeability in the substratum limits the use of this soil for septic tank absorption fields.

Capability subclass: VIIs.

PcE—Paxton fine sandy loam, 25 to 35 percent slopes, extremely stony. This soil is very deep, steep, and well drained. It is on drumlins. Stones that are 2 to 5 feet apart cover from 3 to 15 percent of the surface. The areas of this unit are long and narrow or irregular in shape. They range from 10 to 80 acres, but most are about 15 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 5 inches thick. The subsoil is yellowish brown fine sandy loam about 22 inches thick. The substratum is very firm, grayish brown gravelly fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Canton and Chatfield soils. Also included are areas of soils that have more sand in the substratum than this Paxton soil and areas where stones cover less than 3 percent of the surface. Included areas make up about 15 percent of this unit.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is high. Reaction ranges from very strongly acid to moderately acid. A seasonal high water table is perched at a depth of 1 1/2 to 2 1/2 feet.

Slope and the stones on the surface make this soil poorly suited to cultivated crops, hay, and improved pasture.

This soil is well suited to trees, and most areas are wooded. Slope and the stones on the surface limit the use of some types of equipment.

Slope, the seasonal high water table, and a frost-action potential are the main limitations of this soil as a site for dwellings or local roads and streets. The slow or very slow permeability in the substratum limits the use of this soil for septic tank absorption fields.

Capability subclass: VIIs.

PdC—Paxton-Urban land complex, 8 to 15 percent slopes. This unit is on uplands. It consists of very deep, gently sloping and strongly sloping, well drained soils and areas that have been altered by filling or grading for buildings, parking lots, and other urban structures. The areas of this unit are long and narrow or irregular in shape and range from 20 to 100 acres, but most are about 40 acres. The areas consist of about 45 percent Paxton soils, 30 percent urbanized areas, and 25 percent other soils. The Paxton soils and urbanized areas are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Paxton soils is very dark grayish brown fine sandy loam about 5 inches thick. The subsoil is yellowish brown fine sandy loam about 22 inches thick. The substratum is very firm, grayish brown gravelly fine sandy loam to a depth of 60 inches or more.

Included with this unit in mapping are small areas, mainly less than 3 acres each, of Udorthents and Woodbridge, Ridgebury, and Canton soils.

The permeability of this Paxton soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is high. Reaction ranges from very strongly acid to moderately acid. A seasonal high water table is perched at a depth of 1 1/2 to 2 1/2 feet.

Most areas of this unit are in residential or commercial use. The lack of open space is the main limitation of the unit for cultivated crops or woodland. The Paxton soils are well suited to trees, shrubs, and small gardens. The seasonal high water table and a frost-action potential in the Paxton soils are the main limitations of the unit as a site for dwellings or local roads and streets. The slow or very slow permeability of the substratum is a limitation for septic tank absorption fields.

Capability subclass: not assigned.

Pg—Pits, gravel. This unit consists of areas from which gravel has been removed for use in construction. The excavations mainly are in areas of sandy glacial outwash. Some excavations are in areas of loose, sandy glacial till. The pits are 3 to 50 feet deep and mainly have steep sides and a nearly level floor. Piles of stones and boulders commonly are scattered on the pit floor, and small pools of water are in some pits. The excavations commonly are irregular in shape, depending on the nature of the deposits and ownership boundaries. The pits range from 2 to 100 acres, but most are about 10 acres.

The pits have very low available water capacity. Permeability varies, but it mainly is moderately rapid to very rapid.

Most of these units are devoid of plants, but some older excavations have growths of bushes, grasses, and annuals. The very low available water capacity and steep sides make the unit poorly suited to farming or woodland. The potential for wildlife habitat is poor, but some birds inhabit these areas. The sandy material is a poor filter, and use of the unit for waste disposal facilities causes a hazard of ground-water contamination.

Capability subclass: not assigned.

Pm—Pits, quarry. This unit consists of areas that have been excavated for rock. The areas typically are on the sides and tops of ridges that range from nearly level to very steep. The areas consist of layers of exposed bedrock. The walls are mainly vertical, and the bottom generally is excavated in steps. Small pools of water are at the bottom of many quarries, and some areas have small piles of broken granite at the bottom of and along the edges.

The lack of soil material and difficulty of excavation hinder reclamation of these areas, and very few have been reclaimed. Very little vegetation grows in or around the quarries. The areas have poor potential for most uses because of exposed bedrock, a high percentage of small stone fragments, and very low available water capacity. Onsite investigation is necessary to determine the suitability of the unit for any proposed use.

Capability subclass: not assigned.

PoB—Poquonock loamy sand, 3 to 8 percent slopes. This soil is very deep, gently sloping, and well drained. It is on the toe slopes of uplands and in areas bordering fluvial terraces. The areas of this unit are long and narrow or irregular in shape. They range from 5 to 50 acres, but most are about 10 acres.

Typically, the surface layer is very dark grayish brown loamy sand about 7 inches thick. The subsoil is about 27 inches thick. The upper 4 inches of the subsoil is yellowish brown loamy fine sand. The lower 23 inches is light olive brown loamy sand. The substratum is firm, olive fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Merrimac, Paxton, and Windsor soils. Also included are areas of moderately well drained soils, soils where stones cover from less than 1 percent to 3 percent of the surface, and Poquonock soils with slopes of 0 to 3 percent. Included areas make up about 25 percent of the unit.

The permeability of this Poquonock soil is rapid or very rapid in the subsoil and slow or very slow in the substratum. Available water capacity is high. Reaction ranges from very strongly acid to moderately acid. A seasonal high water table is perched at a depth of 1 1/2 to 2 1/2 feet.

Most areas of this soil are covered with trees. Some areas are used for residential and commercial development, and a few areas are used for cropland.

This soil is well suited to cultivated crops, hay, and improved pasture. Conservation tillage, using cover crops, and contour farming are practices that help to reduce an erosion hazard.

This soil is well suited to trees. The seedling mortality rate is moderate because the soil is droughty at times and low in natural fertility. Fertilizing and mulching are practices that help to increase the fertility and moisture content of the soil.

This soil has no major limitations as a site for dwellings or local roads and streets. The sides of excavations in this soil are unstable, however, and the steeper sides commonly collapse. The seasonal high water table is a limitation in winter and early spring, making drainage necessary in some areas. The slow or very slow permeability of the substratum is a limitation of the soil as a site for septic tank absorption fields.

Capability subclass: IIs.

PoC—Poquonock loamy sand, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and well drained. It is on the lower slopes of the uplands and in areas bordering fluvial terraces. The areas of this unit are long and narrow or irregular in shape. They range from 5 to 40 acres, but most are about 10 acres.

Typically, the surface layer is very dark grayish brown loamy sand about 7 inches thick. The subsoil is about 27 inches thick. The upper 4 inches of the subsoil is yellowish brown loamy fine sand. The lower 23 inches is light olive brown loamy sand. The substratum is firm, olive fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Merrimac, Paxton, and Windsor soils. Also included are areas of moderately well drained soils and soils where stones cover from less than 1 percent to 3 percent of the surface. Included areas make up about 25 percent of the unit.

The permeability of this Poquonock soil is rapid or very rapid in the subsoil and slow or very slow in the substratum. Available water capacity is high. Reaction ranges from very strongly acid to moderately acid. A seasonal high water table is perched at a depth of 1 1/2 to 2 1/2 feet.

Most areas of this soil are covered with trees. Some areas are used for residential and commercial development.

This soil is suited to cultivated crops, hay, and improved pasture. Slope is the main limitation, and erosion is a hazard. Conservation tillage, using cover crops, and contour farming help to reduce erosion.

This soil is well suited to trees. The seedling mortality rate is moderate because the soil is droughty at times and low in natural fertility. Fertilizing and mulching are practices that help to increase the fertility and moisture content of the soil.

Slope and the seasonal high water table are the main limitations of this soil as a site for dwellings or local roads and streets. The slow or very slow permeability in the substratum is a limitation of the soil as a site for septic tank absorption fields.

Capability subclass: IIIe.

PsB—Poquonock loamy sand, 3 to 8 percent slopes, very stony. This soil is very deep, gently sloping, and well drained. It is on the toe slopes of uplands and in areas bordering fluvial terraces. Stones that are 5 to 30 feet apart cover from less than 1 percent to 3 percent of the surface. The areas of this unit are irregular in shape. They range from 5 to 60 acres, but most are about 10 acres.

Typically, the surface layer is very dark grayish brown loamy sand about 7 inches thick. The subsoil is about 27 inches thick. The upper 4 inches of the subsoil is yellowish brown loamy fine sand. The lower 23 inches is light olive brown loamy sand. The substrautm is firm, olive fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Merrimac and Paxton soils. Also included are areas where stones cover more than 3 percent of the surface, areas of moderately well drained soils, and areas where slopes are less than 3 percent or more than 8 percent. Included areas make up about 20 percent of the unit.

The permeability of this Poquonock soil is rapid or very rapid in the subsoil and slow or very slow in the substratum. Available water capacity is high. Reaction ranges from very strongly acid to moderately acid. A seasonal high water table is perched at a depth of 1 1/2 to 2 1/2 feet.

Most areas of this soil are covered with trees. Some areas are used for residential and commercial development.

This soil is poorly suited to cultivated crops, hay, and improved pasture. The stones on the surface are a limitation, and erosion is a hazard. The soil is well suited to these uses if the stones are removed. Conservation tillage, using cover crops, and contour farming help to reduce erosion.

This soil is well suited to trees. The seedling mortality rate is moderate because the soil is droughty at times and low in natural fertility. Fertilizing and mulching are practices that help to increase the fertility and moisture content of the soil.

The seasonal high water table is the main limitation of this soil as a site for dwellings or local roads and streets. The slow or very slow permeability in the substratum limits the soil as a site for septic tank absorption fields.

Capability subclass: VIs.

QnA—Quonset loamy sand, 0 to 3 percent slopes. This soil is very deep, nearly level, and excessively drained. It is on terraces and outwash plains. The areas of this unit are long and narrow or irregular in shape. They range from 10 to 50 acres, but most are about 20 acres.

Typically, the surface layer is very dark brown loamy sand about 3 inches thick (fig. 6). The subsoil is dark yellowish brown and is 15 inches thick. The upper 3 inches is channery loamy sand, and the lower 12 inches is very channery loamy sand. The substratum is olive brown and light olive brown very channery coarse sand to a depth of 60 inches or more.

Figure 6.—Typical soil profile of Quonset loamy sand, 0 to 3 percent slopes.

Included with this soil in mapping are small areas, mainly less than 2 acres each, of Deerfield, Hinckley, and Windsor soils. Also included are areas that have more silt in the surface layer and subsoil than this Quonset soil. Included areas make up about 20 percent of this unit.

The permeability of this Quonset soil is moderately rapid or rapid in the subsoil and very rapid in the substratum. Available water capacity is very low. Reaction is very strongly acid or strongly acid in the surface layer and subsoil and ranges from strongly acid to slightly acid in the substratum.

Most areas of this soil are in brushland. Some areas are used for dwellings, and a few areas are being mined for sand and gravel.

This soil is suited to cultivated crops, hay, and improved pasture. Droughtiness and a low nutrient content are the main limitations. The rapid permeability causes some of the nutrients from fertilizer application to readily pass through the soil. Using cover crops and mixing crop residue and manure into the surface layer are practices that will help maintain the organic matter content and improve the tilth of the soil.

This soil is poorly suited to trees. The droughtiness and low nutrient content causes a high seedling mortality rate. Mulching, mixing crop residue into the soil, and fertilizing are means of reducing the mortality rate.

This soil has no major limitations as a site for dwellings or local roads and streets. The side slopes of excavations in this soil are unstable, however, and the steep sides commonly collapse. Some form of shoring is needed when steep cuts are made. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IIIs.

QnB—Quonset loamy sand, 3 to 8 percent slopes. This soil is very deep, gently sloping, and excessively drained. It is on terraces, eskers, and outwash plains. The areas of this unit are irregular in shape. They range from 10 to 150 acres, but most areas are about 20 acres.

Typically, the surface layer is very dark brown loamy sand about 3 inches thick. The subsoil is dark yellowish brown and is 15 inches thick. The upper 3 inches is channery loamy sand, and the lower 12 inches is very channery loamy sand. The substratum is olive brown and light olive brown very channery coarse sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 2 acres each, of Deerfield, Hinckley, and Windsor soils. Also included are areas that have more silt in the surface layer and subsoil than this Quonset soil. Included areas make up about 20 percent of this unit.

The permeability of this Quonset soil is moderately rapid or rapid in the subsoil and very rapid in the substratum. Available water capacity is very low. Reaction is very strongly acid or strongly acid in the surface layer and subsoil and ranges from strongly acid to slightly acid in the substratum.

Most areas of this soil are in brushland. Some areas are used for dwellings, and a few areas are being mined for sand and gravel.

This soil is suited to cultivated crops, hay, and improved pasture. Droughtiness and a low nutrient

content are the main limitations, and erosion is a hazard. The rapid permeability causes some of the nutrients from fertilizer application to readily pass through the soil. Using cover crops, stripcropping, conservation tillage, and mixing crop residue and manure into the surface layer are practices that will help maintain the organic matter content and reduce erosion.

This soil is poorly suited to trees. The droughtiness and low nutrient content cause a high seedling mortality rate. Mulching, mixing crop residue into the soil, and fertilizing are means of reducing the mortality rate.

This soil has no major limitations as a site for dwellings or local roads and streets. The side slopes of excavations in this soil are unstable, however, and the steep sides commonly collapse. Some form of shoring is needed when steep cuts are made. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IIIs.

QnC—Quonset loamy sand, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and excessively drained. It is on terraces, eskers, and outwash plains. The areas of this soil are irregular in shape. They range from 10 to 100 acres, but most are about 15 acres.

Typically, the surface layer is very dark brown loamy sand about 3 inches thick. The subsoil is dark yellowish brown and is 15 inches thick. The upper 3 inches is channery loamy sand, and the lower 12 inches is very channery loamy sand. The substratum is olive brown and light olive brown very channery coarse sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Hinckley and Windsor soils. Also included are areas of soils that have more silt in the surface layer and subsoil than this Quonset soil. Included areas make up about 20 percent of this unit.

The permeability of this Quonset soil is moderately rapid or rapid in the subsoil and very rapid in the substratum. Available water capacity is very low. Reaction is very strongly acid or strongly acid in the surface layer and subsoil and ranges from strongly acid to slightly acid in the substratum.

Most areas of this soil are in brushland. Some areas are used for dwellings, and a few areas are being mined for sand and gravel.

This soil is suited to cultivated crops, hay, and improved pasture. Droughtiness and a low nutrient content are the main limitations, and erosion is a hazard. The rapid permeability causes some of the nutrients from fertilizer application to readily pass through the soil. Using cover crops, stripcropping, conservation tillage, and mixing crop residue and manure into the surface layer are practices that will help maintain the organic matter content and reduce erosion.

This soil is poorly suited to trees. The droughtiness and low nutrient content cause a high seedling mortality rate. Mulching, mixing crop residue into the soil, and fertilizing are means of reducing the mortality rate.

Slope is the main limitation of this soil as a site for dwellings and local roads and streets. The sides of excavations in this soil are unstable, and the steeper sides commonly collapse. Thus, some form of shoring is needed when steep cuts are made. Placing roads and streets on the contour helps to avoid deep cuts, on which vegetation is difficult to establish. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IVs.

QnD—Quonset loamy sand, 15 to 25 percent slopes. This soil is very deep, moderately steep, and excessively drained. It is on terraces, eskers, and outwash plains. The areas of this unit are irregular in shape. They range from 10 to 70 acres, but most are about 15 acres.

Typically, the surface layer is very dark brown loamy sand about 3 inches thick. The subsoil is dark yellowish brown and is 15 inches thick. The upper 3 inches is channery loamy sand, and the lower 12 inches is very channery loamy sand. The substratum is olive brown and light olive brown very channery coarse sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Hinckley and Windsor soils. Included areas make up about 15 percent of this unit.

The permeability of this Quonset soil is moderately rapid or rapid in the subsoil and very rapid in the substratum. Available water capacity is very low. Reaction is very strongly acid or strongly acid in the surface layer and subsoil and ranges from strongly acid to slightly acid in the substratum.

Most areas of this soil are in brushland. Some areas are being mined for sand and gravel.

Slope, droughtiness, and a low nutrient content make this soil poorly suited to cultivated crops, hay, and improved pasture. The rapid permeability causes some of the nutrients from fertilizer application to readily pass through the soil. Conservation tillage, stripcropping, using cover crops, and mixing crop residue and manure into the surface layer will help maintain the organic matter content of the soil and help reduce erosion.

This soil is poorly suited to trees. The droughtiness and low nutrient content cause a high seedling mortality rate. Mulching, mixing crop residue into the soil, and fertilizing are means of reducing the mortality rate.

Slope is the main limitation of this soil as a site for dwellings and local roads and streets. The sides of excavations in this soil are unstable, and the steeper sides commonly collapse. Thus, some form of shoring is

needed when steep cuts are made. Placing roads and streets on the contour helps to avoid deep cuts, on which vegetation is difficult to establish. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: VIs.

Ra—Raynham silt loam. This soil is very deep, nearly level, and poorly drained. It is on old lake plains. The areas of this soil are irregular in shape. They range from 5 to 30 acres, but most are about 5 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is very dark brown silt loam about 3 inches thick. The subsoil is silt loam about 21 inches thick. The upper 9 inches is light olive brown, and the lower 12 inches is a light olive gray. The substrautm is olive silt loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Amostown and Belgrade soils. Also included are soils with slopes of 3 to 8 percent. Included areas make up about 20 percent of this unit.

The permeability of this Raynham soil is moderate or moderately slow in the subsoil and slow in the substratum. Available water capacity is high. Reaction is strongly acid to slightly acid in the surface layer and subsoil and moderately acid to neutral in the substratum. The seasonal high water table is at a depth of 6 inches to 2 feet during the winter and early spring.

This soil is suited to cultivated crops, hay, and improved pasture, but some form of drainage is necessary. Mixing crop residue and manure into the plow layer improves the tilth and increases the organic matter content of the soils.

This soil is poorly suited to trees. Some areas are wooded. The seasonal high water table limits the use of equipment and causes a high seedling mortality rate. The water table also restricts rooting, and many trees are subject to uprooting during windy periods.

The seasonal high water table is the major limitation of the soil as a site for dwellings, local roads and streets, and septic tank absorption fields. A frost-action potential is a further limitation.

Capability subclass: IIIw.

RdA—Ridgebury fine sandy loam, 0 to 3 percent slopes. This soil is very deep, nearly level, and poorly drained. It is in low-lying areas and depressions. The areas of this soil are long and narrow or irregular in shape. They range from 5 to 15 acres, but most are about 5 acres.

Typically, the surface layer is black fine sandy loam about 9 inches thick. The subsoil is about 14 inches thick. The upper 5 inches is dark grayish brown fine sandy loam, and the lower 9 inches is olive gray gravelly fine sandy loam. The substratum is olive and olive gray fine sandy loam to a depth of 60 inches or more. It is very firm in the upper part and firm in the lower part.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Whitman and Woodbridge soils. Also included are areas of poorly drained soils that are friable to a depth of more than 30 inches. Included areas make up about 15 percent of this unit.

The permeability of this Ridgebury soil is moderate or moderately rapid in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to moderately acid throughout the soil. The seasonal high water table is between the surface and a depth of 1 1/2 feet during the winter and early spring.

Most areas of this soil are in woodland. Some areas are used for pasture.

This soil is suited to cultivated crops, hay, and improved pasture. The seasonal high water table is the main limitation. Installing drainage and the proper timing of farming operations are the main management concerns.

This soil is poorly suited to trees. The seasonal high water table limits the use of equipment and causes a high rate of seedling mortality. It also limits rooting, and some trees are subject to uprooting during windy periods.

The seasonal high water table and a frost-action potential limit this soil as a site for dwellings and local roads and streets. Some form of drainage is necessary to overcome the wetness. The water table and the slow or very slow permeability in the substratum are limitations of the soil as a site for septic tank absorption fields.

Capability subclass: IIIw.

RdB—Ridgebury fine sandy loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and poorly drained. It is in low-lying areas and depressions. The areas of this soil are long and narrow or irregular in shape. They range from 5 to 30 acres, but most are about 10 acres.

Typically, the surface layer is black fine sandy loam about 9 inches thick. The subsoil is about 14 inches thick. The upper 5 inches is dark grayish brown fine sandy loam, and the lower 9 inches is olive gray gravelly fine sandy loam. The substratum is olive and olive gray fine sandy loam to a depth of 60 inches or more. It is very firm in the upper part and firm in the lower part.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Whitman and Woodbridge soils. Also included are areas of poorly drained soils that are friable to a depth of more than 30 inches. Included areas make up about 20 percent of this unit.

The permeability of this Ridgebury soil is moderate or moderately rapid in the subsoil and slow or very slow in

the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to moderately acid throughout the soil. The seasonal high water table is between the surface and a depth of 1 1/2 feet during the winter and early spring.

Most areas of this soil are in woodland. Some areas are used for pasture.

This soil is suited to cultivated crops, hay, and improved pasture. The seasonal high water table is the main limitation. Installing drainage and the proper timing of farming operations are the main management concerns.

This soil is poorly suited to trees. The seasonal high water table limits the use of equipment and causes a high rate of seedling mortality. It also limits rooting, and some trees are subject to uprooting during windy periods.

The seasonal high water table and a frost-action potential limit this soil as a site for dwellings and local roads and streets. Some form of drainage is necessary to overcome the wetness. The water table and the slow or very slow permeability in the substratum are limitations of the soil as a site for septic tank absorption fields.

Capability subclass: IIIw.

RsA—Ridgebury fine sandy loam, 0 to 3 percent slopes, extremely stony. This soil is very deep, nearly level, and poorly drained. It is in low-lying areas and depressions. Stones that are 2 to 5 feet apart cover 3 to 15 percent of the surface. The areas of this soil are long and narrow or irregular in shape. They range from 5 to 25 acres, but most are about 5 acres.

Typically, the surface layer is black fine sandy loam about 9 inches thick. The subsoil is about 14 inches thick. The upper 5 inches is dark grayish brown fine sandy loam, and the lower 9 inches is olive gray gravelly fine sandy loam. The substratum is olive and olive gray fine sandy loam to a depth of 60 inches or more. It is very firm in the upper part and firm in the lower part.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Whitman and Woodbridge soils. Also included are areas where stones cover less than 3 percent of the surface and poorly drained soils that are friable to a depth of more than 30 inches. Included areas make up about 25 percent of this unit.

The permeability of this Ridgebury soil is moderate or moderately rapid in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to moderately acid throughout the soil. The seasonal high water table is between the surface and a depth of 1 1/2 feet during the winter and early spring.

This soil is poorly suited to cultivated crops, hay, and improved pasture. The stones on the surface and the seasonal high water table are the main limitations. Installing drainage, proper timing of farming operations, and clearing of stones are the main management concerns.

This soil is poorly suited to trees. Most areas are wooded. The seasonal high water table limits the use of equipment and causes a high rate of seedling mortality. It also limits rooting, and some trees are subject to uprooting during windy periods.

The seasonal high water table and a frost-action potential limit this soil as a site for dwellings and local roads and streets. Some form of drainage is necessary to overcome the wetness. The water table and the slow or very slow permeability in the substratum are limitations of the soil as site for septic tank absorption fields.

Capability subclass: VIIs.

RsB—Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony. This soil is very deep, gently sloping, and poorly drained. It is in low-lying areas and depressions. Stones that are 2 to 5 feet apart cover 3 to 15 percent of the surface. The areas of this soil are long and narrow or irregular in shape. They range from 5 to 50 acres, but most are about 10 acres.

Typically, the surface layer is black fine sandy loam about 9 inches thick. The subsoil is about 14 inches thick. The upper 5 inches is dark grayish brown fine sandy loam, and the lower 9 inches is olive gray gravelly fine sandy loam. The substratum is olive and olive gray fine sandy loam to a depth of 60 inches or more. It is very firm in the upper part and firm in the lower part.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Whitman and Woodbridge soils. Also included are areas where stones cover less than 3 percent of the surface and poorly drained soils that are friable to a depth of more than 30 inches. Included areas make up about 25 percent of this unit.

The permeability of this Ridgebury soil is moderate or moderately rapid in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to moderately acid throughout the soil. The seasonal high water table is between the surface and a depth of 1 1/2 feet during the winter and early spring.

This soil is poorly suited to cultivated crops, hay, and improved pasture. The stones on the surface and the seasonal high water table are the main limitations. Installing drainage, proper timing of farming operations, and clearing of stones are the main management concerns.

This soil is poorly suited to trees. Most areas are wooded. The seasonal high water table limits the use of equipment and causes a high rate of seedling mortality. It also limits rooting, and some trees are subject to uprooting during windy periods.

The seasonal high water table and a frost-action potential limit this soil as a site for dwellings and local roads and streets. Some form of drainage is necessary to overcome the wetness. The water table and the slow or very slow permeability in the substratum are limitations of the soil as a site for septic tank absorption fields.

Capability subclass: VIIs.

Sa—Saco silt loam. This soil is very deep, nearly level, and very poorly drained. It is on flood plains. The areas of this soil are irregular in shape. They range from 5 to 30 acres, but most are about 5 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is very dark gray silt loam about 12 inches thick. The substratum extends to a depth of 60 inches or more. The upper part is very dark gray and gray very fine sandy loam, and the lower part is gray and dark gray silt loam.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Limerick and Swansea soils. Also included are soils that have more sand in the substratum than this Saco soil. Included areas make up about 15 percent of the unit.

The permeability in the substratum of this Saco soil is moderate in the upper part and rapid or very rapid in the lower part. Available water capacity is high. Reaction ranges from strongly acid to slightly acid in the upper 30 inches of the soil and from moderately acid to neutral below a depth of 30 inches. The seasonal high water table is between the surface and a depth of 6 inches during winter and early spring.

Frequently, brief flooding and the seasonal high water table make this soil poorly suited to farming and woodland and are the major limitations for community development. Most areas of the soil are in native vegetation.

Capability subclass: VIw.

Sc—Scarboro mucky fine sandy loam. This soil is very deep, nearly level, and very poorly drained. It is in low-lying areas and depressions on outwash plains. The areas of this soil are irregular in shape. They range from 5 to 50 acres, but most are about 10 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is covered with about 8 inches of organic material. The surface layer is black mucky fine sandy loam about 6 inches thick. The substratum is grayish brown and extends to a depth of 60 inches or more. The upper part is loamy sand, the middle part is sand, and the lower part is gravelly sand.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Swansea and Walpole soils. Also included are poorly drained, sandy soils. Included areas make up about 20 percent of this unit.

The permeability of this Scarboro soil is rapid or very rapid throughout. Available water capacity is high. Reaction ranges from very strongly acid to moderately acid. The water table is between the surface and a depth of 1 foot during most of the year.

Most areas of this soil are covered with brush and trees.

The high water table makes this soil poorly suited to farming and woodland and is the main limitation for community development. The water table restricts the root zone of trees, limits the use of equipment, and causes a high rate of seedling mortality.

Capability subclass: Vw.

SdA—Sudbury fine sandy loam, 0 to 3 percent slopes. This soil is very deep, nearly level, and moderately well drained. It is in slight depressions on outwash plains. The areas of this soil are irregular in shape. They range from 10 to 30 acres, but most are about 10 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 9 inches thick. The subsoil is yellowish brown and is about 16 inches thick. The upper 9 inches is fine sandy loam, and the lower 7 inches is gravelly loamy sand. The substratum is light olive brown gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Agawam, Merrimac, Ninigret, and Walpole soils. Included areas make up about 20 percent of the unit.

The permeability of this Sudbury soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is high. Reaction ranges from extremely acid to moderately acid throughout. The seasonal high water table is at a depth of 1 1/2 to 3 feet.

Most areas of this soil are used for cropland. Some are used for residential or commercial development.

This soil is well suited to woodland, cultivated crops, hay, and improved pasture. The main farming management concerns are providing drainage where needed and maintaining the organic matter content. Using proper stocking rates and rotational grazing are pasture management practices that help to maintain desirable plant species.

The seasonal high water table is a limitation of this soil as a site for dwellings or local roads and streets, and drainage is needed. The sides of excavations in this soil are unstable, and the steeper sides commonly collapse, making some form of shoring necessary. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IIw.

SdB—Sudbury fine sandy loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is in slight depressions on outwash plains. The areas of this soil are irregular in

shape. They range from 10 to 50 acres, but most are about 15 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 9 inches thick. The subsoil is yellowish brown and is about 16 inches thick. The upper 9 inches is fine sandy loam, and the lower 7 inches is gravelly loamy sand. The substratum is light olive brown gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Agawam, Merrimac, Ninigret, and Walpole soils. Included areas make up about 20 percent of the unit.

The permeability of this Sudbury soil is moderately rapid in the subsoil and rapid in the substratum. Available water capacity is high. Reaction ranges from extremely acid to moderately acid throughout. The seasonal high water table is at a depth of 1 1/2 to 3 feet.

Most areas of this soil are used for cropland. Some are used for residential or commercial development.

This soil is well suited to woodland, cultivated crops, hay, and improved pasture. The seasonal high water table is a limitation for farming, and erosion is a hazard. Providing drainage where needed and maintaining the organic matter content are the main farming management concerns. Farming on the contour and using tillage methods that leave large amounts of crop residue on the surface help to control erosion in cultivated areas. Use of proper stocking rates and rotational grazing are pasture management practices that help to maintain desirable plant species.

The seasonal high water table is a limitation of this soil as a site for dwellings or local roads and streets, and drainage is needed. The sides of excavations in this soil are unstable, and the steeper sides commonly collapse, making some form of shoring necessary. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IIe.

Su—Suncook loamy fine sand. This soil is very deep, nearly level, and excessively drained. It is on flood plains bordering the stream channel. The areas of this soil are circular, long and narrow, or irregular in shape. They range from 5 to 60 acres, but most are about 10 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark brown loamy fine sand about 9 inches thick. The substratum is dark yellowish brown and yellowish brown sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres in size, of Hadley soils. Also included are soils with slopes of more than 3 percent. Included areas make up about 15 percent of this unit.

The permeability of this Suncook soil is rapid or very rapid in the substratum. Available water capacity is low. Reaction is very strongly acid to slightly acid throughout the soil.

Most areas of this soil are idle. A few areas are used for cropland.

This soil is suited to woodland, cultivated crops, hay, and improved pasture. Occasional, brief flooding and the low available water capacity are the main limitations. Mixing crop residue and manure into the surface layer helps to improve tilth and increase organic matter content in cultivated areas.

Flooding is the major limitation to use of this soil as a site for dwellings and local roads and streets. This soil is unstable, and sides of excavations commonly collapse. Thus, some form of shoring is needed where steep cuts are made. The rapid permeability in the substratum causes a hazard of ground-water contamination in areas that are used for waste disposal.

Capability subclass: IIIs.

Sw—Swansea muck. This soil is very deep, nearly level, and very poorly drained. It is in bogs and depressions on outwash plains and glacial till uplands. The areas of this soil are round or irregular in shape. They range from 5 to 80 acres, but most are about 10 acres. Slopes range from 0 to 3 percent.

Typically, the upper layers are black organic material to a depth of about 36 inches. The substratum is olive gray sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Freetown, Saco, Scarboro, and Whitman soils. Also included are soils that have a loamy substratum. Included areas make up about 20 percent of this unit.

The permeability of this Swansea soil is moderate or moderately rapid in the organic material and very rapid in the substratum. Available water capacity is high. Reaction is extremely acid throughout the soil. The water table is between the surface and a depth of 1 foot for most of the year.

Most areas of this soil support a growth of water-tolerant species of brush and grass. A few areas are covered with trees.

The water table makes this soil poorly suited to woodland, cultivated crops, hay, and improved pasture. The water table causes a high rate of seedling mortality, limits the use of equipment, and restricts rooting, making trees susceptible to uprooting during windy periods.

The high water table, the content of organic matter in the soil, and low strength are the main limitations of the soil as a site for dwellings, local roads and streets, and waste-disposal facilities. The permeability of the soil causes a hazard of ground-water contamination in areas used for waste disposal.

Capability subclass: Vw.

Ud—Udorthents, smoothed. The soils in this unit are very deep, nearly level to steep, and excessively drained

to moderately well drained. The soil material has been excavated or has been deposited from nearby areas. The areas of this unit are long and narrow or irregular in shape. They range from 3 to 30 acres. The depth of excavation or fill material ranges from 2 to 20 feet. Commonly, the soil is olive gray fine sandy loam at least 60 inches thick.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of urban land and areas that are sandier than Udorthents. Also included are areas that have been filled with trash and an area of coal dust and slag adjacent to Route 146 in the southeastern part of Worcester. Included areas make up about 20 percent of this unit.

The range in the properties and characteristics of this unit is so wide that onsite investigation is needed to determine the suitability of the unit for any use.

Capability subclass: not assigned.

Ur—Urban land. This unit consists mainly of buildings, shopping centers, roads, and parking lots. Most areas are in the built-up parts of cities and some of the densely populated suburbs. The vegetation commonly is limited to lawns and ornamental trees and shrubs. Determination of the suitability of these areas for any use requires onsite investigation.

Capability subclass: not assigned.

Wa—Walpole fine sandy loam. This soil is very deep, nearly level, and poorly drained. It is in low-lying areas and depressions on outwash plains. The areas of this soil are long and narrow or irregular in shape. They range from 5 to 60 acres, but most are about 10 acres. Slopes range from 0 to 3 percent.

Typically, the surface is covered with 2 inches of organic matter. The surface layer is very dark grayish brown fine sandy loam about 6 inches thick. The subsoil is dark grayish brown and olive sandy loam about 16 inches thick. The substratum is light olive brown gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Scarboro and Sudbury soils that make up about 20 percent of the unit.

The permeability of this Walpole soil is moderately rapid in the subsoil and rapid or very rapid in the substratum. Available water capacity is high. Reaction ranges from very strongly acid to moderately acid throughout the soil. The seasonal high water table is between the surface and a depth of 1 foot.

Most areas of this soil are covered with trees. A few areas have been drained and are used for cropland.

This soil is suited to cultivated crops, hay, and improved pasture. The seasonal high water table is the main limitation. It restricts the root zone of some plants and limits the use of equipment, and some form of drainage is needed to overcome its effects.

The seasonal high water table makes the soil poorly suited to trees. It limits the use of equipment and causes a high rate of seedling mortality. The seasonal high water table also limits the root zone of trees, causing a hazard of uprooting during windy periods.

The water table and a frost-action potential are the main limitations of this soil as a site for dwellings and local roads and streets. The water table also limits the soil as a site for waste disposal, and the rapid permeability in the substratum causes a hazard of ground-water contamination in areas used for waste disposal.

Capability subclass: IIIw.

Wg—Whitman loam. This soil is very deep, nearly level, and very poorly drained. It is in low-lying areas on uplands. The areas of this unit are long and narrow or irregular in shape. They range from 5 to 20 acres, but most are about 5 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is black loam about 10 inches thick. The subsoil is gray fine sandy loam about 8 inches thick. The substratum is light gray and olive, firm fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Ridgebury and Swansea soils. Also included are areas of Whitman soils with slopes of 3 to 8 percent. Included areas make up about 30 percent of the unit.

The permeability of this Whitman soil is moderate or moderately rapid in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to slightly acid. The seasonal high water table is between the surface and a depth of 6 inches.

The seasonal high water table makes this soil poorly suited to woodland, cultivated crops, hay, and improved pasture. Most areas are wooded, but the water table limits the use of equipment and causes a high rate of seedling mortality.

The seasonal high water table and a frost-action potential limit this soil as a site for dwellings and local roads and streets. The water table and the slow or very slow permeability in the substratum limit the soil as a site for septic tank absorption fields.

Capability subclass: Vw.

Wh—Whitman loam, extremely stony. This soil is very deep, nearly level, and very poorly drained. It is in low-lying areas on uplands. Stones that are 2 to 5 feet apart cover 3 to 15 percent of the surface. The areas of this soil are long and narrow or irregular in shape. They range from 5 to 20 acres, but most are about 5 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is black loam about 10 inches thick. The subsoil is gray fine sandy loam about 8

inces thick. The substratum is light gray and olive, firm fine sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Ridgebury and Swansea soils. Also included are areas of Whitman soils with slopes of 3 to 8 percent and Whitman soils where stones cover less than 3 percent of the surface. Included areas make up about 30 percent of the unit.

The permeability of this Whitman soil is moderate or moderately rapid in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to slightly acid. The seasonal high water table is between the surface and a depth of 6 inches.

This soil is poorly suited to woodland, cultivated crops, hay, and improved pasture. The stones on the surface and the water table are the main limitations for farming, and the water table limits the use of woodland equipment and causes a high rate of seedling mortality.

The water table and a frost-action potential limit this soil as a site for dwellings and local roads and streets. The seasonal high water table and the slow or very slow permeability in the substratum limit the soil as a site for septic tank absorption fields.

Capability subclass: VIIs.

WnA—Windsor loamy fine sand, 0 to 3 percent slopes. This soil is very deep, nearly level, and excessively drained. The areas of this soil are irregular in shape. They range from 10 to 100 acres, but most are about 20 acres.

Typically, the surface layer is dark yellowish brown loamy fine sand about 10 inches thick. The subsoil is about 20 inches thick. The upper 6 inches is brown loamy fine sand, and the lower 14 inches is light yellowish brown fine sand. The substratum is olive and light olive gray fine sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Agawam, Deerfield, and Hinckley soils. Included areas make up about 20 percent of the unit.

The permeability of this Windsor soil is rapid or very rapid throughout. Available water capacity is low. Reaction ranges from moderately acid to very strongly acid throughout the soil.

Most areas of this soil are in brushland or poor-quality woodland. Some areas are used for residential and commercial development, and a few areas are used for cropland.

This soil is suited to cultivated crops, hay, and improved pasture. Droughtiness is the main limitation. The main management concerns are providing irrigation and fertilizer and increasing organic matter content by mixing crop residue and manure into the surface layer.

This soil is poorly suited to trees. Droughtiness causes a high rate of seedling mortality for all but drought-tolerant species.

This soil has essentially no limitations as a site for dwellings and local streets and roads. The sides of excavations in this soil are unstable, however, and steep sides commonly collapse. Thus, some form of shoring is needed in steep cuts. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IIIs.

WnB—Windsor loamy fine sand, 3 to 8 percent slopes. This soil is very deep, gently sloping, and excessively drained. It is on broad areas and rolling hills. The areas of this soil are irregular in shape. They range from 20 to 150 acres, but most are about 30 acres.

Typically, the surface layer is dark yellowish brown loamy fine sand about 10 inches thick. The subsoil is about 20 inches thick. The upper 6 inches is brown loamy fine sand, and the lower 14 inches is light yellowish brown fine sand. The substratum is olive and light olive gray fine sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Agawam, Deerfield, and Hinckley soils. Included areas make up about 20 percent of the unit.

The permeability of this Windsor soil is rapid or very rapid throughout. Available water capacity is low. Reaction ranges from moderately acid to very strongly acid throughout the soil.

Most areas of this soil are in brushland or poor-quality woodland. Some areas are used for residential and commercial development, and a few areas are used for cropland.

This soil is suited to cultivated crops, hay, and improved pasture. Droughtiness is the main limitation, and erosion is a hazard. Conservation tillage and increasing organic matter content by mixing crop residue and manure into the surface layer are practices that help to reduce the erosion hazard.

This soil is poorly suited to trees. Droughtiness causes a high rate of seedling mortality for all but drought-tolerant species.

This soil has essentially no limitations as a site for dwellings and local streets and roads. The sides of excavations in this soil are unstable, however, and steep sides commonly collapse. Thus, some form of shoring is needed in steep cuts. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IIIs.

WnC—Windsor loamy fine sand, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and excessively drained. It is on sides of eskers and areas bordering sand plains. The areas of this soil are irregular in shape. They range from 10 to 100 acres, but most are about 20 acres.

Typically, the surface layer is dark yellowish brown loamy fine sand about 6 inches thick. The subsoil is about 20 inches thick. The upper 6 inches is brown loamy fine sand, and the lower 14 inches is light yellowish brown fine sand. The substratum is olive and light olive gray fine sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Agawam, Hinckley, and Merrimac soils. Included areas make up about 20 percent of the unit.

The permeability of this Windsor soil is rapid or very rapid throughout. Available water capacity is low. Reaction ranges from moderately acid to very strongly acid throughout the soil.

Most areas of this soil are in brushland or poor-quality woodland. Some areas are used for residential and commercial development, and a few areas are used for cropland.

This soil is suited to cultivated crops, hay, and improved pasture. Droughtiness is the main limitation. The main management concerns are providing irrigation and fertilizer and increasing organic matter content by mixing crop residue and manure into the surface layer.

This soil is poorly suited to trees. Droughtiness causes a high rate of seedling mortality for all but drought-tolerant species.

Slope is the main limitation to use of this soil as a site for dwellings and local roads and streets. The sides of excavations in this soil are unstable, and the steep sides commonly collapse. Excavating and grading and using retention walls are practices used to overcome the slope. Roads and streets should be built on the contour instead of making steep cuts, on which vegetation is difficult to establish. Some form of shoring is needed where steep cuts are made. This soil is a poor filter for effluent in a septic tank absorption field, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: IVs.

WnD—Windsor loamy fine sand, 15 to 25 percent slopes. This soil is very deep, moderately steep, and excessively drained. It is on ridges on outwash plains. The areas of this soil are long and narrow or irregular in shape. They range from 5 to 30 acres, but most are about 5 acres.

Typically, the surface layer is dark yellowish brown loamy fine sand about 4 inches thick. The subsoil is about 20 inches thick. The upper 6 inches is brown loamy fine sand, and the lower 14 inches is light yellowish brown fine sand. The substratum is olive and light olive gray fine sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Hinckley soils that make up about 15 percent of the unit.

The permeability of this Windsor soil is rapid or very rapid throughout. Available water capacity is low. Reaction ranges from moderately acid to very strongly acid throughout the soil.

Most areas of this soil are in brushland or poor-quality woodland.

This soil is poorly suited to cultivated crops, hay, and improved pasture. Slope and droughtiness are the major limitations, and erosion is a hazard. The main management concerns are providing irrigation and increasing organic matter content by mixing crop residue and manure into the surface layer. Stripcropping and conservation tillage help to control erosion.

This soil is poorly suited to trees. Droughtiness causes a high rate of seedling mortality for all but drought-tolerant species.

Slope is the main limitation of this soil as a site for dwellings or local roads and streets. The sides of excavations in this soil are unstable, and the steep sides commonly collapse. Excavating and grading and using retention walls are practices used to overcome the slope. Placing roads and streets on the contour helps to avoid steep cuts, on which vegetation is difficult to establish, and some form of shoring is needed where steep cuts are made. This soil is a poor filter for septic tank absorption fields, and seepage of the effluent through the substratum causes a hazard of ground-water contamination.

Capability subclass: VIs.

Wo—Winooski very fine sandy loam. This soil is very deep, nearly level, and moderately well drained. It is on flood plains. The areas of this soil are irregular in shape. They range from 5 to 100 acres, but most are about 15 acres. Slopes range from 0 to 3 percent.

Typically, the surface layer is very dark grayish brown very fine sandy loam about 8 inches thick. The substratum is multicolored and extends to a depth of 60 inches or more. It is very fine sandy loam in the upper part and loamy very fine sand in the lower part.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Hadley and Limerick soils. Also included are soils with a sandy surface layer and subsoil. Included areas make up about 20 percent of this unit.

The permeability of this Winooski soil is moderate to moderately rapid throughout. Available water capacity is moderate. Reaction ranges from very strongly acid to neutral above a depth of 35 inches and from moderately acid to neutral below a depth of 35 inches. The seasonal

high water table is at a depth of 1 1/2 to 3 feet during winter and early spring.

Most areas of this soil are idle. Some areas are used for cropland.

This soil is well suited to woodland, cultivated crops, hay, and improved pasture. The main limitation is occasional, brief flooding.

Flooding is the major limitation of the soil as a site for dwellings or local roads and streets. The soil is a poor filter for septic tank absorption fields.

Capability subclass: IIw.

WrA—Woodbridge fine sandy loam, 0 to 3 percent slopes. This soil is very deep, nearly level, and moderately well drained. It is on the tops of drumlins and in areas on glacial till uplands (fig. 7). The areas of this soil are irregular in shape or long and narrow. They range from 3 to 20 acres, but most are about 10 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 9 inches thick. The subsoil is dark yellowish brown and light olive brown sandy loam about 13 inches thick. The substratum is very firm, grayish brown sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Paxton and Ridgebury soils. Also included are areas of soils that are friable to a depth of 30 inches or more. Included areas make up about 15 percent of this unit.

The permeability of this Woodbridge soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to moderately acid throughout the soil. The seasonal high water table is at a depth of 1 1/2 to 3 feet.

Most areas of this soil are used for cropland. Some are used for residential development, and a few are covered with trees.

This soil is well suited to woodland, cultivated crops, hay, and improved pasture. This soil is wet until late spring, which restricts the use of heavy equipment and makes drainage a farming management concern.

The seasonal high water table and frost-action potential are the main limitations of the soil as a site for dwellings and local roads and streets. Using drainage will help overcome those limitations. This soil is a poor filter for septic tank absorption fields and most other sanitary facilities because of the slow or very slow permeability in the substratum.

Capability subclass: IIw.

WrB—Woodbridge fine sandy loam, 3 to 8 percent slopes. This soil is very deep, gently sloping, and moderately well drained. It is on the tops of drumlins on glacial till uplands. The areas of this soil are irregularly shaped or rectangular. They range from 5 to 30 acres, but most are about 10 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 9 inches thick. The subsoil is dark yellowish brown and light olive brown sandy loam about 13 inches thick. The substratum is very firm, grayish brown sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Paxton and Ridgebury soils. Also included are areas of soils that are friable to a depth of 30 inches or more. Included areas make up about 15 percent of this unit.

The permeability of this Woodbridge soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to moderately acid throughout. The seasonal high water table is at a depth of 1 1/2 to 3 feet.

Most areas of this soil are used for cropland. Some areas are used for residential development, and a few are wooded.

This soil is well suited to woodland, cultivated crops, hay, and improved pasture. Erosion is a hazard in cultivated areas. This soil is wet until late spring, which restricts the use of heavy equipment and makes drainage a farming management concern.

The seasonal high water table and frost-action potential are the main limitations of the soil as a site for dwellings and local roads and streets. Using drainage will help overcome those limitations. This soil is a poor filter for septic tank absorption fields and most other sanitary facilities because of the slow or very slow permeability in the substratum.

Capability subclass: IIw.

WrC—Woodbridge fine sandy loam, 8 to 15 percent slopes. This soil is very deep, strongly sloping, and moderately well drained. It is on the side slopes of drumlins on glacial till uplands. The areas of this soil are irregularly shaped or rectangular. They range from 5 to 25 acres, but most are about 10 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 9 inches thick. The subsoil is dark yellowish brown and light olive brown sandy loam about 13 inches thick. The substratum is very firm, grayish brown sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Paxton soils. Also included are areas of soils that are friable to a depth of 30 inches or more. Included areas make up about 15 percent of this unit.

The permeability of this Woodbridge soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to moderately acid throughout. The seasonal high water table is at a depth of 1 1/2 to 3 feet.

Figure 7.—An area of Woodbridge fine sandy loam, 0 to 3 percent slopes.

Most areas of this soil are used for cropland. Some are used for community development, and a few areas are wooded.

This soil is suited to cultivated crops, hay, and improved pasture and is well suited to woodland. The seasonal high water table and slope are the main limitations for farming, and erosion is a hazard. Installing drainage is a management concern. Stripcropping, conservation tillage, and contour farming are practices that help reduce erosion in cultivated areas.

The seasonal high water table and frost-action potential are the main limitations of the soil as a site for dwellings and local roads and streets. Using drainage will help overcome those limitations. This soil is a poor filter for septic tank absorption fields and most other sanitary facilities because of the slow or very slow permeability in the substratum.

Capability subclass IIIe.

WsB—Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony. This soil is very deep, nearly level to gently sloping, and moderately well drained. It is on the top of drumlins and on toe slopes of glacial till uplands. Stones that are 5 to 30 feet apart cover from less than 1 percent to 3 percent of the surface. The areas of this soil are irregularly shaped or rectangular. They range from 5 to 80 acres, but most are about 10 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 5 inches thick. The subsoil is dark yellowish brown and light olive brown sandy loam about 13 inches thick. The substratum is very firm, grayish brown sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Paxton and Ridgebury soils. Also included are areas of very stony Woodbridge soils and soils that are friable to a depth of 30 inches or more. Included areas make up about 15 percent of this unit.

The permeability of this Woodbridge soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. Reaction ranges

from very strongly acid to moderately acid throughout. The seasonal high water table is at a depth of 1 1/2 to 3 feet.

Most areas of this soil are covered with trees, and the soil is well suited to woodland. Some areas are used for pasture, and a few are used for residential development.

The stones on the surface and the seasonal high water table make this soil poorly suited to cultivated crops, hay, and improved pasture. The soil is well suited to these uses if the stones are removed. Providing drainage is a management concern in some areas, and erosion is a hazard.

The seasonal high water table and frost-action potential are the main limitations of the soil as a site for dwellings and local roads and streets. Using drainage will help overcome those limitations. This soil is a poor filter for septic tank absorption fields and most other sanitary facilities because of the slow permeability in the substratum.

Capability subclass: VIs.

WsC—Woodbridge fine sandy loam, 8 to 15 percent slopes, very stony. This soil is very deep, strongly sloping, and moderately well drained. It is on the sides of drumlins on glacial till uplands. Stones that are 5 to 30 feet apart cover from less than 1 percent to 3 percent of the surface. The areas of this soil are irregularly shaped. They range from 5 to 50 acres, but most are about 10 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is dark yellowish brown and light olive brown sandy loam about 13 inches thick. The substratum is very firm, grayish brown sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Paxton soils. Also included are areas of soils that are friable to a depth of 30 inches or more. Included areas make up about 15 percent of this unit.

The permeability of this Woodbridge soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to moderately acid throughout. The seasonal high water table is at a depth of 1 1/2 to 3 feet.

Most areas of this soil are covered with trees, and the soil is well suited to trees.

Slope, the seasonal high water table, and the stones on the surface make this soil poorly suited to cultivated crops, hay, and improved pasture. Providing drainage in some areas is a management concern, and erosion is a hazard. Conservation tillage, using cover crops, contour farming, and stripcropping are practices that help to reduce erosion in cultivated areas.

Slope, the seasonal high water table, and a frost-action potential are the main limitations of this soil as a site for dwellings or local roads and streets. The soil is a poor filter for septic tank absorption fields because of the slow or very slow permeability in the substratum.

Capability subclass: VIs.

WtB—Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony. This soil is very deep, nearly level and gently sloping, and moderately well drained. It is on the tops of drumlins and on toe slopes on glacial till uplands. Stones that are 2 to 5 feet apart cover from 3 to 15 percent of the surface. The areas of this soil are irregular in shape. They range from 10 to 80 acres, but most are about 20 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is dark yellowish brown and light olive brown sandy loam about 13 inches thick. The substratum is very firm, grayish brown sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Paxton and Ridgebury soils. Also included are areas of Woodbridge soils where stones cover less than 3 percent of the surface and soils that are friable to a depth of 30 inches or more. Included soils make up about 15 percent of this unit.

The permeability of this Woodbridge soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to moderately acid throughout. The seasonal high water table is at a depth of 1 1/2 to 3 feet.

The stones on the surface and the seasonal high water table make this soil poorly suited to cultivated crops, hay, and improved pasture. The soil is well suited to these uses if the stones are removed. Providing drainage is a management concern in some areas, and erosion is a hazard.

This soil is well suited to trees, and most areas are wooded. The stones on the surface restrict the use of some types of equipment.

The seasonal high water table and frost-action potential are the main limitations of the soil as a site for dwellings and local roads and streets. Using drainage will help to overcome those limitations. This soil is a poor filter for septic tank absorption fields and most other sanitary facilities because of the slow or very slow permeability in the substratum.

Capability subclass: VIIs.

WtC—Woodbridge fine sandy loam, 8 to 15 percent slopes, extremely stony. This soil is very deep, strongly sloping, and moderately well drained. It is on sides of drumlins on glacial till uplands. Stones that are 2 to 5 feet apart cover from 3 to 15 percent of the surface. The areas of this soil are irregular in shape. They range from 10 to 100 acres, but most are about 20 acres.

Typically, the surface layer is very dark grayish brown fine sandy loam about 4 inches thick. The subsoil is dark

yellowish brown and light olive brown sandy loam about 13 inches thick. The substratum is very firm, grayish brown sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas, mainly less than 3 acres each, of Paxton soils. Also included are areas where stones cover less than 3 percent of the surface and soils that are friable to a depth of 30 inches or more. Included areas make up about 15 percent of this unit.

The permeability of this Woodbridge soil is moderate in the subsoil and slow or very slow in the substratum. Available water capacity is moderate. Reaction ranges from very strongly acid to moderately acid throughout the soil. The seasonal high water table is at a depth of 1 1/2 to 3 feet.

Slope, the seasonal high water table, and the stones on the surface make this soil poorly suited to cultivated crops, hay, and improved pasture. Providing drainage in some areas is a management concern, and erosion is a hazard. Conservation tillage, using cover crops, contour farming, and stripcropping are practices that help to reduce erosion in cultivated areas.

This soil is well suited to trees, and most areas are wooded. The stones on the surface limit the use of some types of equipment.

Slope, the seasonal high water table, and a frost-action potential are the main limitations of this soil as a site for dwellings or local roads and streets. The soil is a poor filter for septic tank absorption fields because of the slow or very slow permeability in the substratum.

Capability subclass: VIIs.

Prime Farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The supply of high quality farmland is limited, and the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce a sustained high yield of crops when it is treated and managed using acceptable farming methods. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland may now be in crops, pasture, woodland, or other land, but not urban and built-up land or water areas. It must either be used for producing food or fiber or be available for those uses.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation or irrigation. It also has favorable temperature and growing season and acceptable levels of acidity or alkalinity. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope range is mainly from 0 to 6 percent. For more detailed information on the criteria for prime farmland, consult the local staff of the Soil Conservation Service.

About 41,280 acres, or nearly 17 percent of the survey area, meets the soil requirements for prime farmland. The areas are throughout the county, but most are in the Paxton-Woodbridge-Canton map unit of the general soil map. Approximately 30 percent of this prime farmland is used for crops.

A recent trend in land use in some parts of the county has been toward the loss of some prime farmlands to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and difficult to cultivate and usually are less productive.

Soil map units that make up prime farmland in this survey area are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps in the back of this publication. The soil qualities that affect use and management are described in the section "Detailed soil map units."

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey usefui. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed soil map units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Row crops, hay, and pasture cover about 35,066 acres in the survey area. An estimated 57 percent of this acreage is used for hay and pasture and 43 percent for row crops, mainly silage corn, orchards, vegetables, and nursery plants. The acreages in crops and pasture have steadily declined since the 19th century, mostly because of the increased demand for land for community and industrial development.

Erosion is a hazard on much of the farmland in the survey area, especially on soils where slope exceeds 3 percent. Productivity is reduced when the surface layer is eroded and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging to soils that have a restrictive layer, such as Paxton and Woodbridge soils. Soil erosion further results in sediment entering streams, thereby lowering the water quality for municipal use, recreation, fish, and wildlife.

Erosion control practices provide protective surface cover, reduce runoff, and increase the infiltration of water. A cropping system that keeps plant cover on the soils for extended periods can hold erosion loss to an amount that will not reduce the productivity of the soil. On livestock farms, which require pasture and hay, the legume and grass forage crops in the cropping system reduce erosion on sloping land and provide nitrogen and improved tilth for the next crop.

Other practices that help control erosion are terracing, stripcropping, and using a conservation cropping system. Terraces and diversions are effective in erosion control, but many parts of the survey area have short and irregular slopes that are not suited to terraces. Diversions are effective in intercepting water and thus protecting fields downslope. Stripcropping, a practice in which alternate strips of row crops and close-growing crops are planted across the slope, is also an effective practice in controlling erosion. Stripcropping is best suited to soils that have long, uniform slopes.

Conservation tillage—a system that leaves part or all of the previous crop residue on the soil surface—helps maintain organic matter content, reduces soil erosion,

and helps retain soil moisture by reducing evaporation.

A *seasonal high water table* is a major concern for many soils in the survey area. Some soils are naturally so wet that the production of crops common to this area is generally not feasible. Examples of such soils are very poorly drained Whitman and Scarboro soils.

The poorly drained soils, including Ridgebury and Walpole soils, are too wet for good crop production during most years. Random tile drainage, drainage ditches, and the use of moisture-tolerant crops are effective measures for farming these soils.

Natural fertility is low in the soils of the survey area. Most of the soils are naturally acid and require applications of lime for crops that are suited to slightly acid or neutral soils. The available phosphorus and potash levels also are naturally low, and fertilizer is needed.

Tilth is important in the germination of seeds and in the infiltration of water into the soil. Soils with good tilth have a surface layer that has granular structure, is friable, and is porous. Many of the soils in the survey area are light in color and low in organic matter content. Generally, the surface layer of these soils has good tilth. Regular additions of crop residue help to maintain structure, organic matter content, and water infiltration.

Special crops grown commercially in the survey area are apples, vegetables, and nursery plants (figs. 8 and 9). Orchards are on nearly level to sloping, well drained and moderately well drained soils. The most common vegetables grown are sweet corn and tomatoes. Deep, friable soils that have good natural drainage are especially well suited to vegetables and nursery crops. Some of these soils are droughty, however, and are suited only if irrigation is provided.

Figure 8.—Nursery stock on Woodbridge fine sandy loam, 3 to 8 percent slopes.

Figure 9.—An apple orchard on Woodbridge fine sandy loam, 3 to 8 percent slopes.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed soil map units."

Woodland Management and Productivity

The survey area is about 43 percent woodland that consists of stands that have been harvested two to four times since settlement. The dominant forest type is northern hardwoods, mainly red maple. Red oak is abundant in some areas.

Table 8 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *d*, restricted root depth; *s*, sandy texture; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, d, s, and r.

In table 8, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in

management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that few trees may be blown down by strong winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in 50 years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

Recreation

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

The variety of vegetation in the survey area is sufficient to provide habitat for most species of wildlife common to Massachusetts. The upland areas support white-tailed deer and many smaller game species, including ring-necked pheasant, ruffed grouse, cottontail rabbit, and red and gray foxes. The Wachusett

Reservoir, the Nashua River, and other waterways in the area contain brook, brown, and rainbow trout, as well as largemouth and smallmouth bass, pickerel, pike, perch, and bluegill.

Privately owned land and public and quasipublic land, including several areas operated by the Massachusetts Division of Fisheries and Wildlife, provide the wildlife habitat in the area. One of the largest of the public lands is the Oxbow National Wildlife Refuge, covering 662 acres in Harvard and owned and managed by the U.S. Fish and Wildlife Service. It serves as a nesting and feeding area for black ducks, wood ducks, mallards, geese, and a variety of other waterfowl.

Wildlife species that have recently expanded their range into this survey area include the cardinal, the tufted titmouse, the mockingbird, and the opossum. A few other species are thought to be existing in this area in limited numbers. Among these are the marbled salamander and the eastern coyote.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, millet, rye, and buckwheat.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, bromegrass, clover, alfalfa, timothy, redtop, bluestem, reed canarygrass, and orchardgrass.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are goldenrod, beggarweed, wild strawberries, hawkweed, milkweed, dandelion, hardhack, boneset, and meadow-rye.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, aspen, cherry, birch, maple, apple, hawthorn, dogwood, hickory, blackberry, blueberry, and rose. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are autumn-olive, crabapple, amur honeysuckle, and chokeberry.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, juniper, and hemlock.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are honeysuckle, alderberry, hobblebush, witch hazel, arrowwood, dogwoods, and witherod. The potential for shrubs is not rated on table 10.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, jewelweed, blueflag, purple loosestrife, cattail, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, swamps, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs:

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include mourning dove, killdeer, pheasant, meadowlark, field sparrow, cottontail, skunks, woodchuck, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include blue jay, chickadee, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, muskrat, mink, beaver, herons, kingfishers, frogs, and turtles.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the

ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excessive gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants growth. Material from the surface layer, therefore, should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific

purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding;

subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The

estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Some soils in table 17 are assigned to two hydrologic soil groups. Dual grouping is used for some soils that are less than 20 inches deep to bedrock. The first letter applies to areas where the bedrock is cracked and pervious and the second letter to areas where the bedrock is impervious or where exposed bedrock makes up more than 25 percent of the surface of the soil.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, no more than once in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An *artesian* water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and

on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*4*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Inceptisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquept (*Aqu*, meaning water, plus *ept*, from Inceptisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquepts (*Hapl*, meaning minimal horizonation, plus *aquept*, the suborder of the Inceptisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Aeric* identifies the subgroup that typifies the great group. An example is Aeric Haplaquepts.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-silty, mixed, nonacid, mesic Aeric Haplaquepts.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil that is typical of the series in the survey area, is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*3*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*4*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

Agawam series

The Agawam series consists of very deep, well drained soils on outwash plains and stream terraces. The soils formed in glacial outwash. Slopes range from 0 to 15 percent.

Agawam soils and Ninigret soils formed in the same kind of materials, and Agawam soils are adjacent to Canton and Merrimac soils. The Agawam soils are not mottled in the subsoil and substratum as are the Ninigret soils. The Agawam soils have a stratified substratum; the Canton soils are uniform throughout the substratum. The

Agawam soils have an abrupt textural change that is not characteristic in the Merrimac soils.

Typical pedon of Agawam fine sandy loam, 0 to 3 percent slopes, 45 feet north and 50 feet east of the intersection of Thayer Street and Route 20, in the town of Northborough:

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; friable; many fine roots; 1 percent gravel; very strongly acid; abrupt wavy boundary.

Bw1—7 to 14 inches; yellowish brown (10YR 5/6) fine sandy loam; weak fine granular structure; friable; many fine roots; 1 percent gravel; very strongly acid; abrupt wavy boundary.

Bw2—14 to 25 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine granular structure; friable; many fine roots; 1 percent gravel; very strongly acid; clear smooth boundary.

2C1—25 to 29 inches; yellowish brown (10YR 5/4) gravelly loamy coarse sand; single grain; loose; few medium roots; 30 percent gravel; very strongly acid; abrupt smooth boundary.

2C2—29 to 38 inches; light olive brown (2.5Y 5/4) very gravelly coarse sand; single grain; loose; few medium roots in upper part; 50 percent gravel; very strongly acid; gradual wavy boundary.

2C3—38 to 60 inches; light yellowish brown (2.5Y 6/4) very gravelly coarse sand; single grain; loose; 40 percent gravel; very strongly acid.

The solum thickness ranges from 15 to 32 inches and typically corresponds to the depth to sandy material. The content of rock fragments ranges from 0 to 10 percent in the subsoil and from 0 to 60 percent in the substratum. Reaction of the soil in unlimed areas is slightly acid to very strongly acid.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 through 4.

The B horizon has hue of 7.5YR through 5Y, value of 4 or 5, and chroma of 3 through 6. It is fine sandy loam, very fine sandy loam, or loam.

The C horizon has hue of 10YR through 5Y, value of 4 through 7, and chroma of 3 or 4. It is stratified and ranges from loamy fine sand to coarse sand or their gravelly or very gravelly analogs.

Amostown series

The Amostown series consists of very deep, moderately well drained soils on outwash plains and old lacustrine lakebeds. The soils formed in glacial outwash material underlain by lacustrine deposits. Slopes range from 3 to 8 percent.

Amostown soils and Hinesburg and Belgrade soils formed in similar material. Amostown soils are adjacent to Ninigret soils. The Amostown soils are mottled in the subsoil; the Hinesburg are not. The Amostown soils have a silty substratum; the Belgrade soils are silty throughout, and the Ninigret soils are sandy in the substratum.

Typical pedon of Amostown fine sandy loam, in an area of Amostown and Belgrade soils, 3 to 8 percent slopes, 1 mile north on Tank Trail Road from its intersection with Still River Depot Road, 150 feet west in woods behind sand pit, in the town of Harvard:

Ap—0 to 8 inches; dark brown (10YR 3/3) fine sandy loam; weak fine granular structure; friable; many fine and medium roots; strongly acid; abrupt smooth boundary.

Bw1—8 to 12 inches; light olive brown (2.5Y 5/6) fine sandy loam; weak fine granular structure; friable; common fine roots; strongly acid; clear smooth boundary.

Bw2—12 to 24 inches; light olive brown (2.5Y 5/4) fine sandy loam; weak fine granular structure; friable; few fine roots; strongly acid; clear smooth boundary.

Bw3—24 to 30 inches; light olive brown (2.5Y 5/4) fine sandy loam; common medium distinct yellowish brown (10YR 5/6) and olive gray (5Y 5/2) mottles; weak fine granular structure; friable; strongly acid; abrupt smooth boundary.

2C1—30 to 36 inches; light olive brown (2.5Y 5/4) loamy sand; common medium distinct grayish brown (10YR 5/2) mottles; single grain; loose; slightly acid; abrupt smooth boundary.

3C2—36 to 60 inches; olive gray (5Y 5/2) stratified silt and very fine sand; common medium faint olive (5Y 5/4) mottles; massive; firm; moderately acid.

The solum thickness and the depth to the loamy sand or stratified silt range from 22 to 40 inches. The content of rock fragments ranges from 0 to 10 percent in the solum, but none are in the C horizon. The solum ranges from strongly acid to neutral.

The A horizon has hue of 10YR and value and chroma of 2 through 4. It is fine sandy loam, sandy loam, or loam.

The Bw1 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 4 through 8. The Bw2 horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 2 through 6. The Bw3 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 through 4. The B horizon is sandy loam, fine sandy loam, or very fine sandy loam.

The C horizon has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 1 through 4. The 2C1 horizon is fine sand or loamy sand. The 3C2 horizon is silt loam, very fine sandy loam, silt, or very fine sand.

The Amostown soils in this survey area are a taxadjunct to the Amostown series because they have a thin layer of loamy sand overlying the stratified silt. This difference does not significantly affect use or management.

Belgrade series

The Belgrade series consists of very deep, moderately well drained soils on lacustrine plains and terraces. The soils formed in lacustrine deposits in old glacial lakebeds. Slopes range from 3 to 8 percent.

Belgrade soils are associated with Amostown and Raynham soils and are adjacent to Ninigret soils. The Belgrade soils in this survey area are mapped only with Amostown soils. The Belgrade soils have more silt in the solum than the Amostown or Ninigret soils and do not have mottles in the upper part of the subsoil as do the Raynham soils.

Typical pedon of Belgrade silt loam, in an area of Amostown and Belgrade soils, 3 to 8 percent slopes, 0.3 mile south on Solomon Pond Road from Route 290, 50 feet west of Solomon Pond Road, in the town of Northborough:

Ap—0 to 10 inches; dark brown (10YR 3/3) silt loam; weak medium granular structure; friable; common fine roots; strongly acid; clear smooth boundary.

Bw1—10 to 16 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; friable; common fine roots; moderately acid; clear smooth boundary.

Bw2—16 to 36 inches; light olive brown (2.5Y 5/4) silt loam; many medium distinct light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; few fine roots in upper part; neutral; abrupt smooth boundary.

C—36 to 60 inches; light olive brown (2.5Y 5/4) silt loam; thin strata of silt and silty clay loam; common fine and medium distinct light brownish gray (2.5Y 6/2) and light yellowish brown (2.5Y 6/4) mottles; massive; friable; neutral.

The solum ranges from 20 to 40 inches in thickness. The content of rock fragments ranges from 0 to 5 percent throughout. Reaction ranges from very strongly acid to neutral.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam or very fine sandy loam.

The Bw1 horizon has hue of 10YR through 5Y, value of 4 or 5, and chroma of 4 through 6. The Bw2 horizon has hue of 10YR through 5Y, value of 4 through 6, chroma of 2 through 4, and it is mottled. The B horizon is silt loam or very fine sandy loam.

The C horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 1 through 3. It mainly is silt loam, very fine sandy loam, or loamy very fine sand. Some pedons have thin strata of sand and gravel or silty clay loam or silt typically below a depth of 40 inches.

Canton series

The Canton series consists of very deep, well drained soils on glaciated uplands. The soils formed in friable till derived mainly from gneiss and granite. Slopes range from 3 to 35 percent.

Canton soils are similar to Agawam and Merrimac soils but did not form in the stratified material that is characteristic of the Agawam and Merrimac soils.

Typical pedon of Canton fine sandy loam, 3 to 8 percent slopes, 1,250 feet north on Spectacle Hill Road from the Hudson town line, 50 feet west of the road, in the town of Bolton:

Ap—0 to 4 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; friable; many fine roots; 5 percent rock fragments; strongly acid; abrupt smooth boundary.

Bw1—4 to 7 inches; strong brown (7.5YR 5/6) fine sandy loam; weak fine granular structure; friable; many fine roots; 10 percent rock fragments; strongly acid; clear smooth boundary.

Bw2—7 to 13 inches; yellowish brown (10YR 5/6) fine sandy loam; massive; friable; common fine roots; 10 percent rock fragments; strongly acid; gradual smooth boundary.

Bw3—13 to 26 inches; yellowish brown (10YR 5/4) gravelly fine sandy loam; massive; friable; few fine roots; 15 percent rock fragments; strongly acid; abrupt smooth boundary.

2C—26 to 60 inches; grayish brown (2.5Y 5/2) gravelly loamy sand; single grain; loose; 25 percent rock fragments; strongly acid.

The solum thickness ranges from 18 to 36 inches and corresponds to the depth to the coarse textured till. The content of rock fragments ranges from 5 to 25 percent in the solum and 20 to 30 percent in the substratum. Reaction throughout the soil ranges from extremely acid to strongly acid.

The A horizon has hue of 10YR, value of 2 through 4, and chroma of 1 through 3. It is fine sandy loam, loam, or very fine sandy loam.

The B horizon has hue of 7.5YR through 2.5Y and value and chroma of 4 through 6. It is fine sandy loam, loam, or very fine sandy loam or their gravelly analogs.

The 2C horizon has hue of 2.5Y or 5Y, value of 5 through 7, and chroma of 2 or 3. It is the gravelly analogs of loamy sand, loamy fine sand, or loamy coarse sand.

Chatfield series

The Chatfield series consists of moderately deep, well drained and somewhat excessively drained soils on uplands. The soils formed in glacial till underlain by rock

that is dominantly gneiss and schist. Slopes range from 3 to 25 percent.

Chatfield soils are associated on the landscape and mapped with Hollis soils and are adjacent to Canton, Paxton, and Woodbridge soils. The Chatfield soils are 20 to 40 inches to bedrock; the Hollis soils are less than 20 inches deep to bedrock, and the Canton, Paxton, and Woodbridge soils are at least 60 inches deep to bedrock.

Typical pedon of Chatfield fine sandy loam, in a wooded area of Chatfield-Hollis-Rock outcrop complex, 3 to 15 percent slopes, 1.1 miles west on Green Street from the intersection of Warren and Green Streets, 120 feet north of Green Street, in the town of Boylston:

Oi—2 inches to 0; partially decomposed leaf litter.
A—0 to 3 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; 5 percent rock fragments; moderately acid; clear wavy boundary.
Bw1—3 to 8 inches; yellowish brown (10YR 5/6) fine sandy loam; weak fine subangular blocky structure; friable; many fine and medium roots; 5 percent rock fragments; strongly acid; clear smooth boundary.
Bw2—8 to 24 inches; light olive brown (2.5Y 5/4) fine sandy loam; weak fine subangular blocky structure; friable; few fine roots; 5 percent rock fragments; strongly acid; clear smooth boundary.
Bw3—24 to 30 inches; light yellowish brown (2.5Y 6/4) fine sandy loam; weak fine subangular blocky structure; friable; 5 percent rock fragments; strongly acid; abrupt wavy boundary.
R—30 inches; bedrock.

The solum thickness ranges from 16 to 36 inches, and the depth to the bedrock ranges from 20 to 40 inches. The content of rock fragments ranges from 5 to 20 percent throughout the soil. Reaction ranges from very strongly acid to moderately acid throughout the soil.

The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 through 4. It is loam, fine sandy loam, or sandy loam.

The B horizon has hue of 10YR or 2.5Y and value and chroma of 4 through 6. It is loam, fine sandy loam, or sandy loam. Some pedons have a C horizon with color and texture similar to those of the B horizon.

Deerfield series

The Deerfield series consists of deep, moderately well drained soils on deltas, stream terraces, and outwash plains. The soils formed in glacial outwash. Slopes range from 0 to 3 percent.

Deerfield soils formed in the same kind of material as Windsor soils and are adjacent to Scarboro and Subury soils. The Deerfield soils have low-chroma mottles within 40 inches of the surface; the Windsor soils do not have mottles. The Deerfield soils are browner than the Scarboro and have less gravel in the substratum than the Sudbury soils.

Typical pedon of Deerfield sandy loam, 1,250 feet west of the intersection of Route 31 and Turnpike Road, 230 feet south of Turnpike Road, in the city of Fitchburg:

Oi—2 inches to 0; partially decomposed leaf litter.
A—0 to 2 inches; black (10YR 2/1) sandy loam; weak fine granular structure; very friable; many fine roots; very strongly acid; abrupt smooth boundary.
Bw1—2 to 8 inches; dark brown (7.5YR 4/4) sandy loam; massive; very friable; few roots; many light yellowish brown (10YR 6/4) streaks; strongly acid; clear smooth boundary.
Bw2—8 to 14 inches; strong brown (7.5YR 5/6) loamy sand; massive; very friable; moderately acid; clear smooth boundary.
Bw3—14 to 24 inches; yellowish brown (10YR 5/6) loamy fine sand; massive; very friable; moderately acid; gradual smooth boundary.
C1—24 to 34 inches; light brownish gray (2.5Y 6/2) fine sand; common distinct grayish brown (2.5Y 5/2) and light olive brown (2.5Y 5/4) mottles; massive; very friable; moderately acid; gradual smooth boundary.
C2—34 to 60 inches; light olive gray (5Y 6/2) fine sand; many distinct yellowish red (5YR 4/6) mottles; single grain; loose; moderately acid.

The solum thickness ranges from 15 to 30 inches. The content of rock fragments ranges from 0 to 15 percent in the solum and from 0 to 20 percent in the substratum. Unless limed, the soil ranges from very strongly acid to slightly acid.

The A horizon has hue of 10YR, value of 2 through 4, and chroma of 1 through 3. It is loamy sand, sandy loam, or fine sandy loam.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 3 through 6. The Bw1 horizon ranges from fine sandy loam to sand. The Bw2 and Bw3 horizons are loamy fine sand, loamy sand, sand, or coarse sand.

The C horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 1 through 4. It is fine sand, coarse sand, sand, loamy sand, or stratified sand and gravel.

Freetown series

The Freetown series consists of very deep, very poorly drained soils on uplands and outwash plains. The soils formed in decomposed organic material more than 51 inches thick. Slopes range from 0 to 2 percent.

Freetown soils are associated with Swansea soils and are adjacent to outwash and glacial till soils. The Freetown soils consist of at least 51 inches of organic matter; the organic matter in the Swansea soils is 16 to

51 inches thick. The Freetown soils are organic; the adjacent outwash and glacial till soils are mineral.

Typical pedon of Freetown muck, 950 feet south on Sewall Street from its intersection with South Road, 30 feet east of the road, in the town of Boylston:

Oa1—0 to 4 inches; dark reddish brown (5YR 2/2) broken face and rubbed muck; 65 percent fiber, 10 percent rubbed; weak medium granular structure; friable; many medium roots; woody fibers; less than 5 percent mineral; extremely acid; abrupt smooth boundary.

Oa2—4 to 9 inches; black (5YR 2/1) broken face and rubbed muck; 15 percent fiber, 3 percent rubbed; moderate medium granular structure; friable; common medium roots; woody fibers; less than 5 percent mineral; extremely acid; abrupt smooth boundary.

Oa3—9 to 17 inches; dark reddish brown (5YR 2/2) broken face and rubbed muck; 10 percent fiber, 1 percent rubbed; weak coarse granular structure; friable; few fine roots; woody fibers; less than 5 percent mineral; extremely acid; abrupt smooth boundary.

Oa4—17 to 23 inches; black (5YR 2/1) broken and rubbed muck; 5 percent fiber, 1 percent rubbed; massive; friable; few fine roots; 10 percent woody coarse fragments 5 millimeters in diameter; less than 5 percent mineral; extremely acid; abrupt smooth boundary.

Oa5—23 to 33 inches; black (5YR 2/1) broken face and rubbed muck; 3 percent fiber, 0 percent rubbed; massive; friable; few fine roots; 5 percent woody coarse fragments 5 millimeters in diameter; less than 5 percent mineral; extremely acid; gradual smooth boundary.

Oa6—33 to 60 inches; dark reddish brown (5YR 2/2) broken face and rubbed muck; 3 percent fiber, 0 percent rubbed; massive; friable; 5 percent woody coarse fragments 5 millimeters in diameter; less than 5 percent mineral; extremely acid.

The organic material extends to a depth of 51 inches or more. The subsurface and bottom tiers are cumulatively less than 10 inches of hemic material and less than 5 inches of fibric material. Woody fragments are in some part of the profile or throughout the profile in some pedons and make up 0 to 25 percent of some horizons.

The surface tier is neutral or has hue of 5YR through 10YR, value of 2 or 3, and chroma of 0 through 2. It is dominantly sapric material.

The subsurface tier is neutral or has hue of 5YR through 10YR, value of 2 through 4, and chroma of 0 through 4. It is dominantly sapric matrial.

The bottom tier has hue, value, and chroma similar to those of the subsurface tier. Unrubbed organic material has variable amounts of woody and herbaceous plant tissue.

Hadley series

The Hadley series consists of very deep, well drained soils on flood plains. The soils formed in loamy alluvial deposits. Slopes range from 0 to 3 percent.

Hadley soils are adjacent to Suncook and Winooski soils. The Hadley soils have more silt in the upper 40 inches than the Suncook soils. The Hadley soils do not have mottles in the upper 40 inches; the Winooski soils are mottled.

Typical profile of Hadley very fine sandy loam, 200 feet east of the Nashua River, 200 feet west on Route 117 from the Bolton town line and 200 feet south of Rcute 117, in the town of Lancaster:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) very fine sandy loam; weak fine granular structure; very friable; many roots; very strongly acid; abrupt wavy boundary.

C1—8 to 40 inches; light olive brown (2.5Y 5/4) very fine sandy loam; massive; friable; common roots in upper 26 inches, few roots in lower 6 inches; moderately acid; clear smooth boundary.

C2—40 to 60 inches; olive (5Y 5/3) very fine sandy loam; massive; friable; few roots; many fine distinct yellowish red (5YR 4/6) stains; moderately acid.

The thickness and number of subhorizons correspond closely to the thickness and number of alluvial deposits. The reaction ranges from very strongly acid to mildly alkaline. Most areas are free of rock fragments, but some layers have as much as 5 percent fine gravel.

The A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 through 4. It is silt loam or very fine sandy loam.

The C horizon has hue of 10YR through 5Y, value of 3 through 6, and chroma of 2 through 4. To a depth of 40 inches, it mainly is silt to very fine sand, but some pedons have thin strata of loamy fine sand, fine sand, or sand. Below 40 inches, it ranges from silt loam to sand.

Hinckley series

The Hinckley series consists of very deep, excessively drained soils on stream terraces, eskers, kames, and outwash plains. The soils formed in glacial outwash. Slopes range from 0 to 35 percent.

Hinckley soils are associated with Merrimac, Quonset, and Windsor soils. The Hinckley soils have more gravel in the upper 40 inches than the Merrimac or Windsor soils. The Hinckley soils are lighter colored than the Quonset soils.

Typical pedon of Hinckley sandy loam, 8 to 15 percent slopes, 240 feet west of Route 140, at the edge of a

gravel pit, 50 feet north of the intersection of Route 140 and John Dee Road, in the town of Sterling:

A—0 to 3 inches; very dark grayish brown (10YR 3/2) sandy loam; weak very fine granular structure; friable; many fine roots; 10 percent rock fragments; strongly acid; abrupt wavy boundary.
Bw1—3 to 12 inches; yellowish brown (10YR 5/6) gravelly loamy sand; weak fine granular structure; very friable; common fine roots; 20 percent rock fragments; moderately acid; clear smooth boundary.
Bw2—12 to 21 inches; yellowish brown (10YR 5/6) gravelly loamy coarse sand; single grain; loose; few fine roots; 30 percent rock fragments; moderately acid; abrupt smooth boundary.
C—21 to 60 inches; light olive brown (2.5Y 5/4) stratified sand and gravel; single grain; loose; 65 percent rock fragments; moderately acid.

The solum thickness ranges from 12 to 30 inches. The content of rock fragments ranges from 10 to 50 percent in the solum and 35 to 70 percent in the substratum. Reaction ranges from extremely acid to moderately acid.

The A horizon has a hue of 10YR, value of 2 through 4, and chroma of 1 through 3. It is loamy sand, loamy coarse sand, or sandy loam or their gravelly analogs.

The Bw1 horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 8. The Bw2 horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 4 through 8. The B horizon is sandy loam, loamy sand, or loamy coarse sand or their gravelly or very gravelly analogs.

The C horizon has hue of 2.5Y or 5Y, value of 5 through 7, and chroma of 2 through 8. It ranges mainly from gravelly or very gravelly loamy fine sand to cobbly coarse sand, or it is stratified sand and gravel.

Hinesburg series

The Hinesburg series consists of very deep, well drained soils on deltas and old lakebeds. The soils formed in glacial outwash underlain by glaciolacustrine deposits. Slopes range from 3 to 8 percent.

Hinesburg soils are adjacent to Amostown, Belgrade, and Windsor soils. The Hinesburg soils do not have mottles; the Amostown soils are mottled. The Hinesburg soils have more sand in the solum than the Belgrade soils and have more silt and fine sand in the substratum than the Windsor soils.

Typical pedon of Hinesburg loamy sand, 3 to 8 percent slopes, 0.7 mile south of Route 2 along railroad track, 300 feet east of Tank Trail Road (Fort Devens), in the town of Harvard:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) loamy sand; weak fine and medium granular structure; very friable; many roots; moderately acid; abrupt wavy boundary.
Bw1—7 to 18 inches; yellowish brown (10YR 5/6) loamy sand; single grain; loose; many roots; moderately acid; abrupt wavy boundary.
Bw2—18 to 28 inches; light yellowish brown (2.5Y 6/4) fine sand; single grain; loose; common roots; moderately acid; abrupt wavy boundary.
C1—28 to 31 inches; grayish brown (2.5Y 5/2) fine sand; single grain; loose; very few roots; moderately acid; abrupt smooth boundary.
2C2—31 to 60 inches; olive (5Y 5/3) silt loam; weak thick platy structure; firm; very few roots; strongly acid.

The solum thickness ranges from 16 to 32 inches, and the depth to loamy material ranges from 18 to 40 inches. The content of rock fragments ranges from 0 to 5 percent throughout. Reaction is moderately acid or slightly acid in the solum and ranges from strongly acid to neutral in the substratum.

The A horizon has a hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is loamy sand, loamy fine sand, or sandy loam.

The B horizon has hue of 7.5YR through 2.5Y, value of 4 through 6, and chroma of 4 through 6. It is loamy fine sand, loamy sand, or fine sand.

The C horizon has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 1 through 4. It is loamy fine sand, loamy sand, or fine sand. Some pedons do not have a C horizon. The 2C horizon has hue of 2.5Y or 5Y, value of 4 or 5, and chroma of 1 through 4. It mainly is silt loam or very fine sandy loam. Some pedons have thin strata of very fine sand.

Hollis series

The Hollis series consists of shallow, well drained or somewhat excessively drained soils on uplands. The soils formed in glacial till derived mainly from schist and gneiss. Slopes range from 3 to 25 percent. In this survey area the Hollis soils are mapped only with Chatfield soils and Rock outcrop.

Hollis soils and Chatfield soils formed in similar material, and Hollis soils are adjacent to Paxton and Woodbridge soils. The Hollis soils have bedrock at a depth of 10 to 20 inches; bedrock in the Chatfield, Paxton, and Woodbridge soils is at a depth of more than 20 inches.

Typical pedon of Hollis fine sandy loam, in an area of Chatfield-Hollis-Rock outcrop complex, 3 to 15 percent slopes, 1,000 feet north and 50 feet west of the intersection of Sherry Street and the county line, in the town of Harvard:

Oi—2 inches to 0; black (5YR 2/1) partly decomposed leaf litter.
A1—0 to 1 inches; very dark brown (10YR 2/2) fine sandy loam; moderate medium granular structure;

friable; many fine and medium roots; 5 percent rock fragments; very strongly acid; abrupt irregular boundary.
A2—1 to 4 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; friable; many fine and medium roots; 5 percent rock fragments; very strongly acid; clear smooth boundary.
Bw1—4 to 8 inches; dark brown (7.5YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; 5 percent rock fragments; very strongly acid; clear smooth boundary.
Bw2—8 to 12 inches; yellowish brown (10YR 5/4) fine sandy loam; weak subangular blocky structure; friable; common roots; 10 percent rock fragments; very strongly acid; clear smooth boundary.
Bw3—12 to 17 inches; yellowish brown (10YR 5/4) gravelly fine sandy loam; weak coarse and medium subangular blocky structure; friable; few roots; 15 percent rock fragments; very strongly acid; abrupt irregular boundary.
R—17 inches; schist bedrock.

The solum thickness and depth to bedrock range from 10 to 20 inches. The content of rock fragments ranges from 2 to 25 percent. Reaction throughout the soil is very strongly acid to moderately acid.

The A horizon has hue of 10YR, value of 2 through 4, and chroma of 2 or 3. It is fine sandy loam, loam, or sandy loam.

The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 through 6. It is fine sandy loam, loam, or sandy loam or their gravelly analogs.

The bedrock is hard, unweathered schist or gneiss.

Limerick series

The Limerick series consists of very deep, poorly drained soils on flood plains. The soils formed in alluvial deposits. Slopes range from 0 to 3 percent.

Limerick soils are on the landscape with Hadley and Winooski soils. The Limerick soils are mottled within a depth of 12 inches; the Hadley soils do not have mottles, and the Winooski soils are mottled at a depth of 12 to 40 inches. The Winooski soils are browner than the Limerick soils.

Typical pedon of Limerick silt loam, 100 feet west of the Bolton town line on Route 117, 500 feet south of Route 117 and 1/4 mile east of the Nashua River, in the town of Lancaster:

Ap—0 to 9 inches; dark grayish brown (2.5Y 4/2) silt loam; common fine distinct olive gray (5Y 5/2) and strong brown (7.5YR 5/6) mottles; weak medium granular structure; friable; common roots; moderately acid; abrupt wavy boundary.
Cg1—9 to 20 inches; olive gray (5Y 4/2) silt loam; common fine distinct olive (5Y 5/3) and dark yellowish brown (10YR 4/4) mottles; massive; friable; few roots; moderately acid; abrupt wavy boundary.
Cg2—20 to 29 inches; olive gray (5Y 5/2) silt loam; many fine faint light olive brown (2.5Y 5/6) and dark grayish brown (2.5Y 4/2) mottles; massive; firm; few roots; moderately acid; abrupt smooth boundary.
Cg3—29 to 60 inches; olive gray (5Y 5/2) very fine sandy loam; few fine distinct yellowish brown (10YR 5/8) and dark yellowish brown (10YR 3/4) mottles; massive; friable; moderately acid.

Reaction ranges from strongly acid to neutral above a depth of 40 inches and from moderately acid to neutral below 40 inches.

The A horizon has hue of 10YR through 5Y, value of 3 or 4, and chroma of 2 or 3. It is silt loam or very fine sandy loam.

The C horizon has hue of 10YR through 5Y and value of 4 or 5. Chroma is 1 or 2 to a depth of 30 inches and 1 through 4 at a depth of more than 30 inches. The horizon is silt loam or very fine sandy loam.

Merrimac series

The Merrimac series consists of very deep, somewhat excessively drained soils on glacial outwash plains, kames, eskers, and stream terraces. The soils formed in glacial outwash. Slopes range from 0 to 25 percent.

Merrimac soils are on the landscape with Agawam, Hinckley, and Windsor soils and are adjacent to Canton soils. The Merrimac soils have more gravel in the solum than the Windsor soils, have less gravel than the Hinckley soils, and do not have the abrupt textural change that is characteristic of the Agawam soils. The Merrimac soils are stratified in the substratum; the Canton soils are not.

Typical pedon of Merrimac fine sandy loam, 3 to 8 percent slopes, 3/4 mile west on Exchange Street from its junction with West Street, 50 feet north of Exchange Street, in the city of Leominster:

Oi—1 inch to 0; partially decomposed pine needles.
A—0 to 2 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; friable; many fine roots; 5 percent rock fragments; very strongly acid; clear irregular boundary.
Bw1—2 to 15 inches; yellowish brown (10YR 5/6) fine sandy loam; weak very fine granular structure; very friable; common fine and medium roots; 10 percent rock fragments; strongly acid; abrupt smooth boundary.
Bw2—15 to 24 inches; light olive brown (2.5Y 5/4) gravelly sandy loam; weak fine granular structure; friable; common fine roots; 15 percent rock fragments strongly acid; abrupt smooth boundary.
2C—24 to 60 inches; light yellowish brown (2.5Y 6/4) stratified sand and gravel; single grain; loose; few

fine roots; 50 percent rock fragments; moderately acid.

The solum thickness and the depth to the stratified sand and gravel range from 18 to 30 inches. The content of rock fragments ranges from 5 to 30 percent in the solum and 25 to 55 percent in the substratum. Reaction of the soil in unlimed areas ranges from extremely acid to moderately acid.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 through 4. Some pedons have an A horizon that has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 or 2. The Ap and A horizons are very fine sandy loam, fine sandy loam, or sandy loam.

The Bw1 horizon has hue of 7.5YR or 10YR, value of 3 through 6, and chroma of 3 through 8. The Bw1 horizon is fine sandy loam, sandy loam, or very fine sandy loam. The Bw2 horizon is sandy loam, gravelly sandy loam, loamy sand, or gravelly loamy sand.

The 2C horizon has hue of 10YR through 5Y and value and chroma of 3 through 6. It is stratified sand and gravel, gravelly sand, or very gravelly sand.

Ninigret series

The Ninigret series consists of very deep, moderately well drained soils on outwash plains and stream terraces. The soils formed in glacial outwash. Slopes range from 0 to 3 percent.

Ninigret soils are on the landscape with Agawam soils and are adjacent to Canton, Deerfield, Merrimac, and Sudbury soils. The Ninigret soils are mottled; the Agawam, Canton, and Merrimac soils are not mottled. The Ninigret soils have less sand in the solum than the Deerfield or Sudbury soils.

Typical pedon of Ninigret fine sandy loam, 0 to 3 percent slopes, 400 feet south of the Massachusetts Turnpike on Parkerville Road, and 50 feet west of Parkerville Road, in the town of Southborough:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; many fine roots; moderately acid; abrupt smooth boundary.

Bw1—9 to 14 inches; yellowish brown (10YR 5/6) fine sandy loam; weak medium subangular blocky structure; very friable; common fine roots; 2 percent rock fragments; moderately acid; clear wavy boundary.

Bw2—14 to 21 inches; yellowish brown (10YR 5/4) fine sandy loam; few fine distinct grayish brown (2.5Y 5/2) and yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; very friable; few fine roots; 2 percent rock fragments; moderately acid; abrupt irregular boundary.

2C1—21 to 32 inches; light olive brown (2.5Y 5/4) loamy fine sand; few fine distinct grayish brown (2.5Y 5/2) and yellowish red (5YR 5/6) mottles; massive; very friable; few fine roots; 5 percent rock fragments; moderately acid; abrupt smooth boundary.

C2—32 to 60 inches; light olive brown (2.5Y 5/4) gravelly loamy sand; common fine distinct grayish brown (2.5Y 5/2) and yellowish red (5YR 5/6) mottles; single grain; loose; few roots in the upper 4 inches; 25 percent rock fragments; moderately acid.

The solum thickness and the depth to sand or sand and gravel range from 18 to 34 inches. The content of rock fragments ranges from 0 to 10 percent above a depth of 30 inches and from 0 to 60 percent below 30 inches. Reaction ranges from very strongly acid to moderately acid.

The A horizon has hue of 10YR, value of 2 through 4, and chroma of 1 through 4. It is fine sandy loam or very fine sandy loam.

The Bw1 horizon has hue of 10YR or 7.5YR and value and chroma of 4 through 6. The Bw2 horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 2 through 6 and is mottled. The B horizon mainly is fine sandy loam or very fine sandy loam. Some pedons have a layer of sandy loam or loamy fine sand that is less than 5 inches thick.

The C horizon has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 2 through 4. It is loamy fine sand, loamy sand, or sand or their gravelly or very gravelly analogs.

Paxton series

The Paxton series consists of very deep, well drained soils on glacial till uplands. The soils formed in friable glacial till overlying firm glacial till. Slopes range from 3 to 35 percent.

Paxton soils are on the landscape with Woodbridge soils and are adjacent to Canton and Poquonock soils. The Paxton soils do not have mottles in the solum and have a very firm substratum; the Woodbridge soils are mottled, and the Canton soils have a friable substratum. The Paxton soils have less sand in the substratum than the Canton soils and less sand in the solum than the Poquonock soils.

Typical pedon of Paxton fine sandy loam, 3 to 8 percent slopes, 1,600 feet east of Lyman Street on railroad track, 400 feet south of railroad track, in the town of Northborough:

A—0 to 5 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; common fine roots; 5 percent rock fragments; moderately acid; abrupt smooth boundary.

Bw1—5 to 12 inches; yellowish brown (10YR 5/6) fine sandy loam; weak medium granular structure; very friable; few fine roots; 5 percent rock fragments; strongly acid; abrupt wavy boundary.

Bw2—12 to 27 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium granular structure; friable; few fine roots; 10 percent rock fragments; moderately acid; abrupt wavy boundary.
Cr—27 to 60 inches; grayish brown (2.5Y 5/2) gravelly fine sandy loam; weak medium platy structure; very firm; 25 percent rock fragments; moderately acid.

The solum thickness ranges from 18 to 36 inches and generally corresponds to the depth to the firm glacial till. The content of rock fragments ranges from 5 to 30 percent throughout. Reaction ranges from strongly acid to moderately acid throughout.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. Some pedons have an Ap horizon that has hue of 10YR, value of 3 or 4, and chroma of 2 through 4. The A horizon is loam, fine sandy loam, or sandy loam.

The Bw1 horizon has hue of 7 5YR or 10YR, value of 4 or 5, and chroma of 4 through 6. The Bw2 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 through 6. The B horizon is loam, fine sandy loam, or sandy loam or their gravelly analogs.

The Cr horizon has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 2 through 4. It is firm or very firm and is brittle. It is loam, fine sandy loam, or sandy loam or their gravelly analogs.

Poquonock series

The Poquonock series consists of very deep, well drained soils on glacial uplands bordering fluvial terraces. The soils formed in outwash deposits over firm glacial till. Slopes range from 3 to 15 percent.

Poquonock soils are on the landscape with Paxton and Woodbridge soils and are adjacent to Hinckley and Windsor soils. The Poquonock soils have more sand in the solum than the Paxton or Woodbridge soils and have less sand in the substratum than the Hinckley or Windsor soils.

Typical pedon of Poquonock loamy sand, 3 to 8 percent slopes, 200 feet east of Patton Road, 1,000 feet southwest of Old Mill Road, in the town of Harvard:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) loamy sand; weak fine granular structure; friable; common fine roots; 3 percent rock fragments; strongly acid; abrupt wavy boundary.
Bw1—7 to 11 inches; yellowish brown (10YR 5/6) loamy fine sand; weak fine granular structure; friable; common fine roots; 5 percent rock fragments; moderately acid; abrupt smooth boundary.
Bw2—11 to 34 inches; light olive brown (2.5Y 5/6) loamy sand; weak fine granular structure; very friable; few medium roots; 10 percent rock fragments; moderately acid; clear smooth boundary.
2Cr—34 to 60 inches; olive (5Y 5/3) fine sandy loam; massive; firm; 10 percent rock fragments; moderately acid.

The solum thickness and the depth to the firm glacial till range from 24 to 36 inches. The content of rock fragments ranges from 0 to 10 percent in the solum and 10 to 30 percent in the substratum. Reaction ranges from very strongly acid to moderately acid.

The A horizon has hue of 7.5YR or 10YR, value of 2 through 4, and chroma of 2 or 3. The A horizon is loamy sand, fine sandy loam, or sandy loam.

The Bw1 horizon has hue of 7.5YR or 10YR and value and chroma of 4 through 6. The Bw2 horizon has hue of 10YR or 2.5Y and value and chroma of 4 through 6. The B horizon is loamy sand, loamy fine sand, or sand.

The 2Cr horizon is neutral or has hue of 2.5Y or 5Y, value of 3 through 5, and chroma of 0 through 4. It is fine sandy loam or sandy loam.

Quonset series

The Quonset series consists of very deep, excessively drained soils on stream terraces, eskers, kames, and outwash plains. The soils formed in glacial outwash. Slopes range from 0 to 25 percent.

Quonset soils are on the landscape with Hinckley, Merrimac, and Windsor soils. The Quonset soils have predominantly dark rock fragments; the Hinckley, Merrimac, and Windsor soils have predominantly lighter colored rock fragments. The Quonset soils have more gravel in the upper 40 inches than the Windsor soils.

Typical pedon of Quonset loamy sand, 3 to 8 percent slopes, 1/2 mile north of Harvard Road on Ponakin Road, 20 feet west of Ponakin Road, in the side of a gravel pit in the town of Lancaster:

A—0 to 3 inches; very dark brown (10YR 2/2) loamy sand; weak medium granular structure; friable; many roots; 5 percent rock fragments; very strongly acid; abrupt smooth boundary.
Bw1—3 to 6 inches; dark yellowish brown (10YR 4/4) channery loamy sand; weak fine and medium granular structure; friable; many roots; 15 percent rock fragments; very strongly acid; clear smooth boundary.
Bw2—6 to 18 inches; dark yellowish brown (10YR 4/4) very channery loamy sand; weak fine and medium granular structure; very friable; many roots; 35 percent rock fragments; 50 percent dark minerals; strongly acid; clear smooth boundary.
2C1—18 to 34 inches; olive brown (2.5Y 4/4) very channery coarse sand; weak fine and medium granular structure; very friable; common roots; 45 percent rock fragments; 75 percent dark minerals; moderately acid; clear smooth boundary.

2C2—34 to 60 inches; light olive brown (2.5Y 5/4) and dark olive gray (5Y 3/2) very channery coarse sand; single grain; loose; few roots; 55 percent rock fragments; 75 percent dark minerals; moderately acid.

The solum thickness ranges from 15 to 30 inches. The content of rock fragments ranges from 5 to 50 percent in the solum and 35 to 75 in the substratum. Reaction is very strongly acid or strongly acid in the solum and ranges from strongly acid to slightly acid in the substratum.

The A horizon has hue of 10YR, value of 2 through 4, and chroma of 1 through 4. It is loamy sand, sandy loam, or fine sandy loam or their channery analogs.

The B horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 4 through 6. Above a depth of 10 inches it is loamy sand, fine sandy loam, or sandy loam. Below 10 inches it is loamy sand or sand or their channery or very channery analogs.

The 2C horizon has hue of 2.5Y or 5Y, value of 4 or 5, and chroma of 1 through 4. It ranges from stratified very channery or extremely channery sand through very channery or extremely coarse channery sand.

Raynham series

The Raynham series consists of very deep, poorly drained soils on old lake plains. The soils formed in lacustrine deposits. Slopes range from 0 to 3 percent.

Raynham soils are on the landscape with Belgrade soils and are adjacent to Walpole soils. The Raynham soils have mottles in the upper part of the subsoil, and the Belgrade soils do not. The Raynham soils have more silt in the solum than the Walpole soils.

Typical pedon of Raynham silt loam, 1/4 mile north of Hudson Road, 100 feet east of Solomon Pond Road, in the town of Northborough:

A—0 to 3 inches; very dark brown (10YR 2/2) silt loam; weak fine granular structure; very friable; many roots; strongly acid; abrupt wavy boundary.

Bw1—3 to 12 inches; light olive brown (2.5Y 5/4) silt loam; common fine prominent yellowish red (5YR 4/8) mottles; weak medium granular structure; friable; few roots; moderately acid; clear wavy boundary.

Bw2—12 to 24 inches; light olive gray (5Y 6/2) silt loam; few fine prominent yellowish red (5YR 4/8) mottles; weak medium granular structure; friable; few roots; moderately acid; abrupt wavy boundary.

C—24 to 60 inches; olive (5Y 5/3) silt loam; many medium distinct light olive brown (2.5Y 5/4) and gray (5Y 6/1) mottles; massive; firm; moderately acid.

The solum thickness ranges from 16 to 30 inches. The content of rock fragments ranges from 0 to 2 percent. Reaction ranges from strongly acid to slightly acid in the solum and from moderately acid to neutral in the substratum.

The A horizon has hue of 10YR or 2.5Y, value of 2 through 4, and chroma of 1 through 3. It is silt loam, silt, or very fine sandy loam.

The B horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 2 through 4. It is silt loam, silt, or very fine sandy loam.

The C horizon has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 1 through 3. It mainly is silt loam or very fine sandy loam. Some pedons have thin strata of loamy fine sand, and some have clay and or sandy layers below a depth of 40 inches.

Ridgebury series

The Ridgebury series consists of very deep, poorly drained soils in low-lying areas on uplands. The soils formed in firm glacial till. Slopes range from 0 to 8 percent.

Ridgebury soils and Paxton and Woodbridge soils formed in the same kind of material, and Ridgebury soils are adjacent to Whitman soils. The Ridgebury soils have mottles in the solum; the Paxton soils do not have mottles. The subsoil in the Ridgebury soils is grayer than that in the Woodbridge soils. The Ridgebury soils have a brownish subhorizon; the Whitman soils are gray throughout.

Typical pedon of Ridgebury fine sandy loam, 0 to 3 percent slopes, 500 feet west of Prospect Hill Road, 1/2 mile north of Madigan Lane, in the town of Harvard:

A—0 to 9 inches; black (10YR 2/1) fine sandy loam; moderate medium granular structure; friable; many fine roots; 10 percent rock fragments; moderately acid; abrupt smooth boundary.

Bg1—9 to 14 inches; dark grayish brown (2.5Y 4/2) gravelly fine sandy loam; common medium and coarse distinct olive gray (5Y 5/2), reddish brown (5YR 4/3), and dark brown (7.5YR 3/2) mottles; massive; friable; few roots; 15 percent rock fragments; moderately acid; clear wavy boundary.

Bg2—14 to 23 inches; olive gray (5Y 5/2) gravelly fine sandy loam; common medium and coarse distinct olive brown (2.5Y 4/4), dark gray (10YR 4/1), and dark reddish brown (5YR 2/2) mottles; massive; friable; few roots; 15 percent rock fragments; moderately acid; clear wavy boundary.

Cr1—23 to 29 inches; olive (5Y 5/3) fine sandy loam; many medium distinct dark yellowish brown (10YR 3/4), dark brown (7.5YR 3/2), and strong brown (7.5YR 5/6) mottles; weak thick platy structure; very firm; 5 percent rock fragments; moderately acid; clear smooth boundary.

Cr2—29 to 60 inches; olive gray (5Y 5/2) fine sandy loam; common medium distinct olive brown (2.5Y

4/4) and strong brown (7.5YR 5/6) mottles; common medium faint light olive gray (5Y 6/2) mottles; massive; firm; 10 percent rock fragments; moderately acid.

The solum thickness ranges from 14 to 30 inches and corresponds to the depth to the firm glacial till. The content of coarse fragments in the solum and substratum ranges from 5 to 30 percent. Reaction ranges from very strongly acid to moderately acid.

The A horizon is neutral or has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 0 through 2. It is sandy loam, fine sandy loam, or loam.

The B horizon has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 1 or 2. It is fine sandy loam, sandy loam, or loam or their gravelly analogs.

The C horizon has hue of 2.5Y or 5Y, value of 3 through 6, and chroma of 1 through 4. It is fine sandy loam or loam or their gravelly analogs. It is firm or very firm.

Saco series

The Saco series consists of very deep, very poorly drained soils on flood plains. The soils formed in alluvial deposits derived mainly from schist and gneiss. Slopes range from 0 to 3 percent.

Saco soils are on the landscape with Limerick and Winooski soils and are adjacent to Whitman soils. The surface layer in the Saco soils is more than 10 inches thick; the thickness of the surface layer in the Limerick and Winooski soils is less than 10 inches. The organic matter content in the Saco soils is greater in some of the lower layers than in the upper layers; the organic matter content in the Whitman soils decreases with depth.

Typical pedon of Saco silt loam, 50 feet south of Massachusetts Route 117, 1/4 mile west of Massachusetts Route 110 on Route 117, in the town of Bolton:

A—0 to 12 inches; very dark gray (10YR 3/1) silt loam; weak fine granular structure; friable; common roots; strong brown (7.5YR 5/8) root stains; strongly acid; abrupt smooth boundary.

Cg1—12 to 29 inches; very dark gray (5Y 3/1) very fine sandy loam; massive; friable; few roots; moderately acid; abrupt smooth boundary.

Cg2—29 to 37 inches; gray (5Y 5/1) very fine sandy loam; common fine distinct reddish yellow (7.5YR 6/8) mottles and common faint olive gray (5Y 4/2) mottles; massive; friable; moderately acid; abrupt smooth boundary.

Cg3—37 to 60 inches; gray (5Y 5/1) and dark gray (5Y 4/1) silt loam; massive; friable; moderately acid.

The content of rock fragments ranges from 0 to 5 percent in the upper 40 inches and from 0 to 50 percent below a depth of 40 inches. Reaction ranges from strongly acid to slightly acid in the upper 30 inches and from moderately acid to neutral below a depth of 30 inches.

The A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 through 3. It is mucky silt loam, silt loam, or very fine sandy loam.

The Cg horizon has hue of 2.5Y, value of 3 through 6, and chroma of 0 or 1. It mainly is silt loam or very fine sandy loam. Some pedons have sand or sand and gravel below a depth of 40 inches.

Scarboro series

The Scarboro series consists of very deep, very poorly drained soils in low-lying areas on outwash plains. The soils formed in glacial outwash. Slopes range from 0 to 3 percent.

Scarboro soils are on the landscape with Deerfield, Walpole, and Windsor soils. The Scarboro soils are grayish throughout and are mottled; the Deerfield and Windsor soils are brownish, and the Windsor soils are not mottled. The Scarboro soils have an organic surface layer; the Walpole soils do not.

Typical pedon of Scarboro mucky fine sandy loam, in a wooded area near the south edge of Forest Hill Cemetery, 60 feet north of Electric Avenue, in the city of Fitchburg:

Oi—1 inch to 0; maple leaves and debris.

Oa—0 to 7 inches; dark brown (10YR 3/3) mucky peat; thin platy structure; friable; common fine roots; very strongly acid; abrupt wavy boundary.

A—7 to 13 inches; black (N 2/0) mucky fine sandy loam; weak medium granular structure; friable; common fine roots; very strongly acid; abrupt smooth boundary.

Cg1—13 to 18 inches; grayish brown (2.5Y 5/2) loamy sand; massive; friable; many fine roots; very strongly acid; abrupt irregular boundary.

Cg2—18 to 21 inches; grayish brown (2.5Y 5/2) sand; common medium distinct dark brown (7.5YR 3/2) and yellowish red (5YR 4/8) mottles; massive; friable; few fine roots; 10 percent rock fragments; very strongly acid; clear wavy boundary.

Cg3—21 to 60 inches; grayish brown (2.5Y 5/2) gravelly sand; single grain; loose; 15 percent rock fragments; strongly acid.

The content of rock fragments ranges from 0 to 30 percent above a depth of 30 inches and 0 to 50 percent below 30 inches. Reaction ranges from very strongly acid to moderately acid throughout the soil.

The Oa horizon is mucky peat or muck and ranges from 2 to 6 inches thick.

The A horizon is neutral or has hue of 7.5YR through 2.5Y, value of 2 or 3, and chroma of 0 through 2. It is fine sandy loam, sandy loam, or loamy sand or their

mucky analogs. Some pedons have an E horizon that is neutral or has hue of 10YR or 2.5Y, value of 4 through 6, and chroma of 0 through 2. It is fine sandy loam, sandy loam, loamy fine sand, fine sand, or sand.

The C horizon is neutral or has hue of 10YR through 5Y, value of 4 through 6, and chroma of 0 through 2. It is loamy sand, loamy fine sand, loamy coarse sand, sand, or their gravelly analogs.

Sudbury series

The Sudbury series consists of very deep, moderately well drained soils on outwash plains and along stream terraces. The soils formed in glacial outwash. Slopes range from 0 to 8 percent.

Sudbury soils are adjacent to and formed in the same kind of material as Merrimack and Ninigret soils formed, and they are adjacent to Deerfield soils. The Sudbury soils have mottles in the solum; the Merrimack soils are not mottled. The Sudbury soils have more sand in the solum than the Ninigret soils and have more gravel in the substratum than the Deerfield soils.

Typical pedon of Sudbury fine sandy loam, 0 to 3 percent slopes, in a cultivated field, 1,000 feet north of the West Boylston town line on Bean Road, 500 feet east of Bean Road, in the town of Sterling:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam; moderate fine granular structure; friable; few fine roots; 10 percent rock fragments; neutral; abrupt smooth boundary.

Bw1—9 to 18 inches; yellowish brown (10YR 5/6) fine sandy loam; weak subangular blocky structure; friable; 5 percent rock fragments; neutral; abrupt smooth boundary.

2Bw2—18 to 25 inches; yellowish brown (10YR 5/4) gravelly loamy sand; common distinct dark brown (7.5YR 4/2) mottles; single grain; loose; 20 percent rock fragments; slightly acid; clear smooth boundary.

2C—25 to 60 inches; light olive brown (2.5Y 5/4) gravelly sand; many distinct strong brown (7.5YR 5/6) and dark brown (7.5YR 4/2) mottles; single grain; loose; 30 percent rock fragments; moderately acid.

The solum thickness ranges from 18 to 30 inches. The content of rock fragments ranges from 0 to 30 percent in the solum and 25 to 65 percent in the substratum. Reaction in unlimed areas ranges from very strongly acid to moderately acid.

The Ap horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 through 4. It is very fine sandy loam, fine sandy loam, or sandy loam.

The Bw1 horizon has hue of 7.5YR or 10YR, value of 3 through 5, and chroma of 3 through 6. The 2Bw2 horizon has hue of 10YR or 2.5Y, value of 3 through 5, and chroma of 3 through 6. The Bw1 horizon is fine sandy loam or sandy loam, and the 2Bw2 is sandy loam to coarse sand or their gravelly analogs.

The 2C horizon has hue of 2.5Y or 5Y, value of 5, and chroma of 2 through 4. The 2C horizon is stratified sand and gravel or is gravelly or very gravelly sand or is coarse sand.

Suncook series

The Suncook series consists of very deep, excessively drained soils on flood plains. The soils formed in alluvial deposits. Slopes range from 0 to 3 percent.

Suncook soils are on the landscape with Hadley, Windsor, and Winooski soils. The Suncook soils are sandier than the Hadley or Winooski soils. The Suncook soils do not have a B horizon; the Windsor soils have a B horizon.

Typical pedon of Suncook loamy fine sand, west end of Acorn Street, 350 feet north of the railroad tracks, near river in the town of Clinton:

Ap—0 to 9 inches; dark brown (10YR 3/3) loamy fine sand; weak medium granular structure; friable; many fine roots; strongly acid; abrupt smooth boundary.

C1—9 to 28 inches; dark yellowish brown (10YR 4/4) sand; single grain; loose; common fine roots; strongly acid; clear smooth boundary.

C2—28 to 60 inches; yellowish brown (10YR 5/4) sand; single grain; loose; moderately acid.

The content of coarse fragments ranges from 0 to 10 percent to a depth of 20 inches, 0 to 20 percent at a depth of 20 to 40 inches, and 0 to 40 percent below a depth of 40 inches. Reaction ranges from very strongly acid to slightly acid.

The A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3. It is loamy fine sand, loamy sand, or sandy loam.

The C horizon has hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 1 through 4. It is loamy fine sand, loamy sand, sand, or coarse sand or their gravelly analogs.

Swansea series

The Swansea series consists of very deep, very poorly drained soils on uplands and outwash plains. The soils formed in 16 to 51 inches of highly decomposed organic material over glacial outwash derived mainly from schist. Slopes range from 0 to 3 percent.

Swansea soils are on the landscape with Freetown soils and are adjacent to Saco, Scarboro, and Whitman soils. The organic material in the Freetown soils is more than 51 inches thick, and the organic material in the Saco, Scarboro, and Whitman soils is less than 16 inches thick.

Typical pedon of Swansea muck, 0.4 mile on Moscow Road from Route 31, 370 feet north of Moscow Road, west of stream in the town of Holden:

Oa1—0 to 6 inches; black (N 2/0) broken face and rubbed muck; 5 percent fiber, 1 percent rubbed; massive; friable; many fine roots; extremely acid; clear smooth boundary.
Oa2—6 to 13 inches; black (10YR 2/1) broken face and rubbed muck; 5 percent fiber, 1 percent rubbed; massive; friable; common roots; extremely acid; clear smooth boundary.
Oa3—13 to 36 inches; black (N 2/0) broken face and rubbed muck; 1 percent fiber, 0 percent rubbed; massive; friable; extremely acid abrupt smooth boundary.
2C—36 to 60 inches; olive gray (5Y 5/2) sand; single grain; loose; strongly acid.

The organic material ranges from 16 to 51 inches in depth and is dominantly sapric material. In the subsurface and bottom tiers, the cumulative thickness of the hemic material is less than 10 inches and that of the fibric material is less than 5 inches. The content of woody fragments ranges from 0 to 25 percent. Reaction is extremely acid throughout the organic material and ranges from very strongly acid to moderately acid in the substratum.

The surface tier is neutral or has hue of 5YR through 10YR, value of 2 or 3, and chroma of 0 through 2.

The subsurface and bottom tiers have hue of 5YR through 10YR, value of 2 or 3, and chroma of 0 through 3.

The 2C horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 1 through 3. It is coarse sand to loamy fine sand or their gravelly analogs.

Udorthents

Udorthents consist of areas formed by the excavation or filling of areas used for nonfarm projects such as athletic fields and highways. Udorthents are near or adjacent to most of the soils of the survey area.

Udorthents in this survey area consist of many different kinds of pedons, none of which is considered typical. A pedon used as a reference for Udorthents is in an area of Udorthents, smoothed, 2,600 feet southwest of the Shrewsbury town line on Route 70, south of Lincoln Street (Route 70), 240 feet west of entrance road, in the city of Worcester:

C1—0 to 7 inches; olive gray (5Y 5/2) fine sandy loam; weak subangular blocky structure; friable; few fine roots; 10 percent rock fragments; strongly acid; gradual smooth boundary.
C2—7 to 60 inches; olive gray (5Y 5/2) fine sandy loam, massive; firm; 5 percent rock fragments; moderately acid.

The C1 horizon has hue of 7.5YR to 5Y, value of 3 through 6, and chroma of 1 through 4. It is loam, fine sandy loam, sandy loam, or loamy fine sand.

The C2 horizon has hue of 10YR through 5Y, value of 3 through 6, and chroma of 1 through 6. It mainly is loam, fine sandy loam, or sandy loam. Some pedons contain thin layers of loamy sand.

Walpole series

The Walpole series consists of very deep, poorly drained soils on low-lying areas on outwash plains and stream terraces. The soils formed in glacial outwash. Slopes range from 0 to 3 percent.

Walpole soils are on the landscape with Sudbury and Scarboro soils and are adjacent to Ridgebury and Whitman soils. The Walpole soils are mottled at a depth of less than 20 inches; the Sudbury soils have mottles at a depth of more than 20 inches. The Walpole soils have a thinner O horizon and less organic matter in the A horizon than the Scarboro soils. The Walpole soils have a loose, sandy substratum; the Ridgebury and Whitman soils are underlain by firm glacial till.

Typical profile of Walpole fine sandy loam, 2,400 feet west of Princeton Road on Route 31, 30 feet south of Turnpike Road, in the town of Fitchburg:

Oi—2 inches to 0; litter.
Oa—0 to 2 inches; decomposed litter.
A—2 to 6 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; very friable; very strongly acid; abrupt smooth boundary.
Bw1—6 to 14 inches; dark grayish brown (2.5Y 4/2) sandy loam; weak fine granular structure; very friable; very strongly acid; clear smooth boundary.
Bw2—14 to 22 inches; olive (5Y 5/3) sandy loam; many medium distinct yellowish brown (10YR 5/4), dark brown (7.5YR 4/4), and light brownish gray (2.5Y 6/2) mottles; massive; friable; 10 percent rock fragments; strongly acid; clear smooth boundary.
2C—22 to 60 inches; light olive brown (2.5Y 5/4) gravelly loamy sand; common medium distinct dark brown (7.5YR 4/4), grayish brown (2.5Y 5/2), and gray (5Y 5/1) mottles; single grain; loose; 30 percent rock fragments; strongly acid.

The solum thickness ranges from 18 to 28 inches and corresponds to the depth of lithological discontinuity. The content of rock fragments ranges from 0 to 25 percent in the solum and from 0 to 50 percent in the 2C horizon. Reaction ranges from very strongly acid to moderately acid.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It is fine sandy loam or sandy loam.

The B horizon has hue of 10YR through 5Y, value of 4 through 6, and chroma of 1 through 3. It is fine sandy loam or sandy loam or their gravelly analogs.

The 2C horizon has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 2 through 4. It is sand or loamy sand or their gravelly analogs.

Whitman series

The Whitman series consists of very deep, very poorly drained soils on uplands. The soils formed in firm glacial till. Slopes range from 0 to 3 percent.

Whitman soils and Paxton, Ridgebury, and Woodbridge soils formed in similar material. The Whitman soils are grayish to a depth of 30 inches; the Paxton and Woodbridge soils are brownish in the upper 10 inches, and the Ridgebury soils have at least one horizon in the upper 30 inches that is brown.

Typical pedon of Whitman loam, 50 feet north of Wachusett Street, 1 mile west of Pleasant Street, in the town of Leominster:

Oi—1 inch to 0; dead grass material.

Ap—0 to 10 inches; black (10YR 2/1) loam; dark gray (10YR 4/1) dry; common medium distinct red (2.5YR 4/8) mottles; weak medium granular structure; friable; 10 percent rock fragments; moderately acid; abrupt wavy boundary.

Bg—10 to 18 inches; gray (5Y 5/1) fine sandy loam; few medium distinct pale olive (5Y 6/4) and light olive brown (2.5Y 5/4) mottles; massive; friable; 7 percent rock fragments; strongly acid; abrupt wavy boundary.

Cr1—18 to 31 inches; light gray (5Y 6/1) fine sandy loam; many medium distinct light olive brown (2.5Y 5/4) mottles; moderate medium platy structure; firm; 7 percent rock fragments; moderately acid; clear wavy boundary.

Cr2—31 to 48 inches; olive (5Y 4/3) fine sandy loam; few medium distinct dark reddish brown (2.5YR 3/4) mottles; massive; firm; 7 percent rock fragments; moderately acid; gradual wavy boundary.

Cr3—48 to 60 inches; olive (5Y 5/3) fine sandy loam; massive; firm; 10 percent rock fragments; moderately acid.

The depth to the firm glacial till ranges from 10 to 30 inches. The content of rock fragments ranges from 5 to 30 percent. Reaction ranges from very strongly acid to slightly acid.

The A horizon is neutral or has hue of 10YR, value of 2 or 3, and chroma of 0 through 2. It is fine sandy loam, loam, or silt loam.

The B horizon is neutral or has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 0 or 1. It is fine sandy loam or loam or their gravelly analogs.

The Cr horizon is neutral or has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 0 through 2 above a depth of 30 inches and 0 through 3 below a depth of 30 inches.

Windsor series

The Windsor series consists of very deep, excessively drained soils on outwash plains and terraces. The soils formed in glacial outwash. Slopes range from 0 to 25 percent.

Windsor soils formed in the same kind of material as Deerfield soils and are adjacent to Agawam, Hinckley, Merrimac, and Suncook soils. The Windsor soils do not have mottles as do the Deerfield soils. The Windsor soils have more sand in the solum than the Agawam or Merrimac soils and less gravel than the Agawam, Hinckley, or Merrimac soils. The Windsor soils have a B horizon; the Suncook soils do not have a B horizon.

Typical pedon of Windsor loamy fine sand, 3 to 8 percent slopes, 1/2 mile north on Milk Street from its junction with Route 9, 1/4 mile west of Milk Street, in the town of Westborough:

Ap—0 to 10 inches; dark yellowish brown (10YR 4/4) loamy fine sand; weak medium granular structure; very friable; many fine roots; moderately acid; abrupt wavy boundary.

Bw1—10 to 16 inches; brown (7.5YR 5/4) loamy fine sand; weak fine granular structure; very friable; common fine roots; strongly acid; clear wavy boundary.

Bw2—16 to 24 inches; light yellowish brown (10YR 6/4) fine sand; single grain; loose; common fine roots; very strongly acid; clear wavy boundary.

Bw3—24 to 30 inches; light yellowish brown (2.5Y 6/4) fine sand; single grain; loose; common fine roots; very strongly acid; clear wavy boundary.

C1—30 to 38 inches; olive (5Y 5/3) fine sand; single grain; loose; few fine roots; very strongly acid; clear smooth boundary.

C2—38 to 60 inches; light olive gray (5Y 6/2) fine sand; single grain; loose; few fine roots; very strongly acid.

The solum thickness ranges from 20 to 32 inches. The content of rock fragments ranges from 0 to 10 percent in the solum and from 0 to 15 percent in the substratum. Reaction ranges from moderately acid to very strongly acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 through 4. It is loamy fine sand, loamy sand, or sandy loam.

The Bw1 horizon has hue of 7.5YR or 10YR and value and chroma of 4 through 6. The Bw2 and Bw3 horizons have hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 through 6. The B horizon is loamy sand or loamy fine sand in the upper part and loamy fine sand, loamy sand, fine sand, or sand in the lower part.

The C horizon has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 2 through 6. It is fine sand or sand.

Winooski series

The Winooski series consists of very deep, moderately well drained soils on flood plains. The soils formed in silty alluvial deposits. Slopes range from 0 to 3 percent.

Winooski soils are on the landscape with Hadley and Limerick soils. The Winooski soils have mottles in the solum; the Hadley soils are not mottled. The Winooski soils are brownish in the solum; the Limerick soils are grayish.

Typical pedon of Winooski very fine sandy loam, 100 feet north of Massachusetts Route 117, 900 feet west of the Bolton town line, in the town of Lancaster:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) very fine sandy loam; weak fine granular structure; very friable; many fine roots; moderately acid; abrupt smooth boundary.

C1—8 to 18 inches; dark grayish brown (10YR 4/2) very fine sandy loam; massive; friable; many fine roots; strongly acid; abrupt smooth boundary.

C2—18 to 26 inches; olive brown (2.5Y 4/4) very fine sandy loam; common medium distinct pinkish gray (5YR 7/2) and brown (10YR 5/3) mottles; massive; friable; few fine roots; strongly acid; abrupt smooth boundary.

C3—26 to 43 inches; olive gray (5Y 5/2) very fine sandy loam; common medium distinct pinkish gray (5YR 7/2) and brown (10YR 5/3) mottles; massive; friable; moderately acid; clear smooth boundary.

C4—43 to 60 inches; olive (5Y 5/3) loamy very fine sand; common medium prominent strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) mottles; massive; friable; moderately acid.

The content of rock fragments ranges from 0 to 5 percent throughout the soil. Reaction ranges from very strongly acid to neutral above a depth of 40 inches and from moderately acid to neutral below 40 inches.

The A horizon has hue of 10YR through 5Y, value of 3 or 4, and chroma of 2 or 3. It is silt loam, very fine sandy loam, or loamy very fine sand.

The C horizon has hue of 10YR through 5Y, value of 3 through 5, and chroma of 2 through 4. It is silt loam, very fine sandy loam, or loamy very fine sand.

Woodbridge series

The Woodbridge series consists of very deep, moderately well drained soils on glacial till uplands. The soils formed in firm glacial till. Slopes range from 0 to 15 percent.

Woodbridge soils and Paxton and Ridgebury soils formed in the same kind of materials, and Woodbridge soils are adjacent to Canton soils. The Woodbridge soils have mottles and a substratum of firm glacial till; the Paxton soils are not mottled, and the Canton soils are friable in the substratum. The Woodbridge soils are browner than the Ridgebury soils.

Typical pedon of Woodbridge fine sandy loam, 3 to 8 percent slopes, 200 feet south of Ashburnham Hill Road and 600 feet east of the Ashburnham town line, in the town of Fitchburg:

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak fine granular structure; friable; many roots; 5 percent rock fragments; moderately acid; abrupt smooth boundary.

Bw1—9 to 16 inches; dark yellowish brown (10YR 4/4) sandy loam; weak fine granular structure; friable; many roots; 10 percent rock fragments; moderately acid; abrupt smooth boundary.

Bw2—16 to 22 inches; light olive brown (2.5Y 5/4) sandy loam; few fine faint olive brown (2.5Y 4/4) mottles; weak fine subangular blocky structure; firm; many roots; 10 percent rock fragments; moderately acid; clear smooth boundary.

Cr—22 to 60 inches; grayish brown (2.5Y 5/2) sandy loam; many medium distinct olive brown (2.5Y 4/4) and light olive brown (2.5Y 5/6) mottles; massive; very firm; 10 percent rock fragments; moderately acid; abrupt smooth boundary.

The solum thickness ranges from 15 to 38 inches and corresponds to the depth to firm glacial till. The content of rock fragments ranges from 5 to 30 percent in the solum. Reaction ranges from very strongly acid to slightly acid.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Some pedons have an A horizon that has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The A horizon is loam, fine sandy loam, sandy loam, or very fine sandy loam.

The Bw1 horizon has hue of 7.5YR or 10YR, value of 3 through 5, and chroma of 3 through 6. The Bw2 horizon has hue of 2.5Y or 10YR, value of 4 through 6, and chroma of 3 through 6. The B horizon is fine sandy loam, loam, or sandy loam or their gravelly analogs.

The Cr horizon has hue of 2.5Y or 5Y, value of 4 through 6, and chroma of 2 through 4. It is sandy loam, fine sandy loam, or loam or their gravelly analogs.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 2.4
Low	2.4 to 3.2
Moderate	3.2 to 5.2
High	More than 5.2

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A form of noninversion tillage that retains protective amounts of residue mulch on the surface throughout the year. It includes no-tillage, strip tillage, stubble mulching, and other types of noninversion tillage.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.
Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.
Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazingland for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.
Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.
Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Esker (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 37.5 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial melt water.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial melt water. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation

application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—
Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.
Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.
Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Narrow-base terrace. A terrace no more than 4 to 8 feet wide at the base. A narrow-base terrace is similar to a broad-base terrace, except for the width of the ridge and channel.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Open space. A relatively undeveloped green or wooded area provided mainly within an urban area to minimize feelings of congested living.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash, glacial. Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by glacial melt water.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to insure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial melt water. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by melt water streams, in a glacial lake or other body of still water in front of a glacier.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-78 at Fitchburg, Mass.]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	34.3	13.7	24.0	58	-11	8	3.77	2.04	5.29	8	17.3
February---	36.2	15.5	25.9	59	-10	7	3.39	2.14	4.51	7	17.3
March------	44.0	24.9	34.5	71	4	27	4.19	2.86	5.41	8	15.1
April------	57.7	35.0	46.4	86	18	205	3.79	2.44	5.00	8	2.9
May--------	69.6	44.8	57.2	91	29	533	3.54	1.78	5.06	8	.0
June-------	78.7	54.8	66.8	96	37	804	3.50	2.08	4.76	8	.0
July-------	83.9	59.8	71.9	97	45	989	3.36	1.74	4.78	6	.0
August-----	82.1	57.7	69.9	97	42	927	3.52	1.78	5.02	7	.0
September--	74.3	49.3	61.8	93	31	654	3.80	1.65	5.63	6	.0
October----	64.1	38.5	51.3	85	20	354	3.77	1.93	5.36	6	.1
November---	50.4	30.4	40.4	75	11	94	4.49	2.89	5.94	8	3.0
December---	37.8	19.0	28.4	64	-5	18	4.47	2.66	6.09	8	13.7
Yearly:											
Average--	59.4	37.0	48.0	---	---	---	---	---	---	---	---
Extreme--	---	---	---	99	-14	---	---	---	---	---	---
Total----	---	---	---	---	---	4,620	45.59	38.28	52.60	88	69.4

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1951-78 at Fitchburg, Mass.]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 15	May 6	May 23
2 years in 10 later than--	April 11	April 30	May 16
5 years in 10 later than--	April 4	April 19	May 4
First freezing temperature in fall:			
1 year in 10 earlier than--	October 14	October 4	September 21
2 years in 10 earlier than--	October 20	October 9	September 26
5 years in 10 earlier than--	October 30	October 17	October 6

TABLE 3.--GROWING SEASON

[Recorded in the period 1951-78 at Fitchburg, Mass.]

Probability	Length of growing season if daily minimum temperature is-		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	186	158	127
8 years in 10	194	165	136
5 years in 10	209	180	154
2 years in 10	224	195	172
1 year in 10	232	203	181

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AgA	Agawam fine sandy loam, 0 to 3 percent slopes	220	0.1
AgB	Agawam fine sandy loam, 3 to 8 percent slopes	1,150	0.4
AgC	Agawam fine sandy loam, 8 to 15 percent slopes	415	0.2
AmB	Amostown and Belgrade soils, 3 to 8 percent slopes	205	0.1
CaB	Canton fine sandy loam, 3 to 8 percent slopes	2,430	1.1
CaC	Canton fine sandy loam, 8 to 15 percent slopes	1,020	0.4
CbB	Canton fine sandy loam, 3 to 8 percent slopes, very stony	2,595	1.1
CbC	Canton fine sandy loam, 8 to 15 percent slopes, very stony	1,980	0.8
CcB	Canton fine sandy loam, 3 to 8 percent slopes, extremely stony	4,205	1.7
CcC	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	4,345	1.8
CcD	Canton fine sandy loam, 15 to 25 percent slopes, extremely stony	1,485	0.6
CcE	Canton fine sandy loam, 25 to 35 percent slopes, extremely stony	345	0.1
ChC	Chatfield-Hollis-Rock outcrop complex, 3 to 15 percent slopes	25,140	10.6
ChD	Chatfield-Hollis-Rock outcrop complex, 15 to 25 percent slopes	11,520	4.8
De	Deerfield sandy loam	605	0.2
Fm	Freetown muck	7,140	3.0
Fp	Freetown muck, ponded	650	0.3
HaA	Hadley very fine sandy loam	205	0.1
HgA	Hinckley sandy loam, 0 to 3 percent slopes	1,600	0.7
HgB	Hinckley sandy loam, 3 to 8 percent slopes	8,700	3.6
HgC	Hinckley sandy loam, 8 to 15 percent slopes	4,560	2.1
HgD	Hinckley sandy loam, 15 to 25 percent slopes	1,870	0.8
HgE	Hinckley sandy loam, 25 to 35 percent slopes	2,415	1.0
HkB	Hinckley sandy loam, 3 to 8 percent slopes, very stony	220	0.1
HkC	Hinckley sandy loam, 8 to 15 percent slopes, very stony	250	0.1
HuC	Hinckley-Urban land complex, 0 to 15 percent slopes	220	0.1
HwB	Hinesburg loamy sand, 3 to 8 percent slopes	130	0.1
Lm	Limerick silt loam	890	0.4
MeA	Merrimac fine sandy loam, 0 to 3 percent slopes	1,845	0.8
MeB	Merrimac fine sandy loam, 3 to 8 percent slopes	10,440	4.3
MeC	Merrimac fine sandy loam, 8 to 15 percent slopes	2,465	1.1
MeD	Merrimac fine sandy loam, 15 to 25 percent slopes	405	0.2
NgA	Ninigret fine sandy loam, 0 to 3 percent slopes	440	0.2
PaB	Paxton fine sandy loam, 3 to 8 percent slopes	11,335	4.6
PaC	Paxton fine sandy loam, 8 to 15 percent slopes	6,630	2.8
PaD	Paxton fine sandy loam, 15 to 25 percent slopes	2,145	0.9
PbB	Paxton fine sandy loam, 3 to 8 percent slopes, very stony	6,410	2.6
PbC	Paxton fine sandy loam, 8 to 15 percent slopes, very stony	5,545	2.4
PbD	Paxton fine sandy loam, 15 to 25 percent slopes, very stony	2,450	1.0
PcB	Paxton fine sandy loam, 3 to 8 percent slopes, extremely stony	5,360	2.3
PcC	Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony	8,160	3.5
PcD	Paxton fine sandy loam, 15 to 25 percent slopes, extremely stony	4,490	1.8
PcE	Paxton fine sandy loam, 25 to 35 percent slopes, extremely stony	2,245	1.0
PdC	Paxton-Urban land complex, 8 to 15 percent slopes	1,370	0.6
Pg	Pits, gravel	2,065	0.9
Pm	Pits, quarry	210	0.1
PoB	Poquonock loamy sand, 3 to 8 percent slopes	205	0.1
PoC	Poquonock loamy sand, 8 to 15 percent slopes	165	0.1
PsB	Poquonock loamy sand, 3 to 8 percent slopes, very stony	315	0.1
QnA	Quonset loamy sand, 0 to 3 percent slopes	250	0.1
QnB	Quonset loamy sand, 3 to 8 percent slopes	1,630	0.7
QnC	Quonset loamy sand, 8 to 15 percent slopes	790	0.3
QnD	Quonset loamy sand, 15 to 25 percent slopes	815	0.3
Ra	Raynham silt loam	345	0.1
RdA	Ridgebury fine sandy loam, 0 to 3 percent slopes	1,100	0.5
RdB	Ridgebury fine sandy loam, 3 to 8 percent slopes	600	0.3
RsA	Ridgebury fine sandy loam, 0 to 3 percent slopes, extremely stony	1,915	0.8
RsB	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	3,050	1.3
Sa	Saco silt loam	660	0.3
Sc	Scarboro mucky fine sandy loam	2,150	0.9
SdA	Sudbury fine sandy loam, 0 to 3 percent slopes	1,085	0.5
SdB	Sudbury fine sandy loam, 3 to 8 percent slopes	1,110	0.5
Su	Suncook loamy fine sand	280	0.1
Sw	Swansea muck	1,760	0.7
Ud	Udorthents, smoothed	4,965	2.1
Ur	Urban land	5,985	2.6
Wa	Walpole fine sandy loam	2,865	1.2
Wg	Whitman loam	900	0.4
Wh	Whitman loam, extremely stony	3,965	1.7
WnA	Windsor loamy fine sand, 0 to 3 percent slopes	960	0.4
WnB	Windsor loamy fine sand, 3 to 8 percent slopes	2,290	1.0
WnC	Windsor loamy fine sand, 8 to 15 percent slopes	1,415	0.6

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
WnD	Windsor loamy fine sand, 15 to 25 percent slopes	910	0.4
Wo	Winooski very fine sandy loam	775	0.3
WrA	Woodbridge fine sandy loam, 0 to 3 percent slopes	995	0.4
WrB	Woodbridge fine sandy loam, 3 to 8 percent slopes	9,020	3.7
WrC	Woodbridge fine sandy loam, 8 to 15 percent slopes	625	0.3
WsB	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	5,295	2.2
WsC	Woodbridge fine sandy loam, 8 to 15 percent slopes, very stony	680	0.3
WtB	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	8,065	3.2
WtC	Woodbridge fine sandy loam, 8 to 15 percent slopes, extremely stony	1,315	0.5
W	Water	8,330	3.5
	Total	238,100	100.0

TABLE 5.--PRIME FARMLAND

[Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland]

Map symbol	Soil name
AgA	Agawam fine sandy loam, 0 to 3 percent slopes
AgB	Agawam fine sandy loam, 3 to 8 percent slopes
AmB	Amostown and Belgrade soils, 3 to 8 percent slopes
CaB	Canton fine sandy loam, 3 to 8 percent slopes
HaA	Hadley very fine sandy loam
HwB	Hinesburg loamy sand, 3 to 8 percent slopes
MeA	Merrimac fine sandy loam, 0 to 3 percent slopes
MeB	Merrimac fine sandy loam, 3 to 8 percent slopes
NgA	Ninigret fine sandy loam, 0 to 3 percent slopes
PaB	Paxton fine sandy loam, 3 to 8 percent slopes
SdA	Sudbury fine sandy loam, 0 to 3 percent slopes
SdB	Sudbury fine sandy loam, 3 to 8 percent slopes
Wo	Winooski very fine sandy loam
WrA	Woodbridge fine sandy loam, 0 to 3 percent slopes
WrB	Woodbridge fine sandy loam, 3 to 8 percent slopes

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Corn silage	Grass-legume hay	Grass-clover
	Tons	Tons	AUM*
AgA---- Agawam	24	4.5	8.5
AgB---- Agawam	24	4.5	8.5
AgC---- Agawam	22	4.0	7.6
AmB---- Amostown and Belgrade	20	3.5	6.6
CaB---- Canton	22	4.5	8.5
CaC---- Canton	20	4.0	7.6
CbB, CbC---- Canton	---	---	---
CcB, CcC, CcD, CcE---- Canton	---	---	---
ChC---- Chatfield-Hollis-Rock outcrop	---	---	---
ChD---- Chatfield-Hollis-Rock outcrop	---	---	---
De---- Deerfield	16	3.0	5.7
Fm, Fp---- Freetown	---	---	---
HaA---- Hadley	28	4.5	8.5
HgA, HgB---- Hinckley	12	2.0	3.8
HgC---- Hinckley	---	---	---
HgD---- Hinckley	---	---	---
HgE, HkB, HkC---- Hinckley	---	---	---
HuC---- Hinckley-Urban land	---	---	---
HwB---- Hinesburg	16	3.5	6.6
Lm---- Limerick	20	3.5	6.6

See footnotes at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn silage	Grass-legume hay	Grass-clover
	Tons	Tons	AUM*
MeA, MeB---------- Merrimac	18	3	5.7
MeC---------- Merrimac	16	3	5.7
MeD---------- Merrimac	14	2.5	4.7
NgA---------- Ninigret	22	3.5	6.6
PaB---------- Paxton	24	4.0	7.6
PaC---------- Paxton	22	4.0	7.6
PaD---------- Paxton	20	3.5	6.6
PbB, PbC, PbD---------- Paxton	---	---	---
PcB, PcC, PcD, PcE-------- Paxton	---	---	---
PdC---------- Paxton-Urban land	---	---	---
Pg**, Pm**. Pits			
PoB---------- Poquonock	16	3.5	6.6
PoC---------- Poquonock	14	3.5	6.6
PsB---------- Poquonock	---	---	---
QnA, QnB---------- Quonset	12	2.0	3.8
QnC---------- Quonset	---	---	---
QnD---------- Quonset	---	---	---
Ra---------- Raynham	18	3.5	6.6
RdA, RdB---------- Ridgebury	16	3.5	6.6
RsA, RsB---------- Ridgebury	---	---	---
Sa---------- Saco	---	---	---
Sc---------- Scarboro	---	---	---
SdA---------- Sudbury	18	4.0	7.6

See footnotes at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn silage	Grass-legume hay	Grass-clover
	Tons	Tons	AUM*
SdB--- Sudbury	18	4.0	7.6
Su--- Suncook	12	2.0	3.8
Sw--- Swansea	---	---	---
Ud**. Udorthents			
Ur**. Urban land			
Wa--- Walpole	18	3.0	5.7
Wg, Wh--- Whitman	---	---	---
WnA, WnB--- Windsor	14	2.5	4.7
WnC--- Windsor	12	2.5	4.7
WnD--- Windsor	---	2.0	3.8
Wo--- Winooski	26	4.0	7.6
WrA--- Woodbridge	24	4.0	7.6
WrB--- Woodbridge	24	4.0	7.6
WrC--- Woodbridge	22	4.0	7.6
WsB, WsC--- Woodbridge	---	---	---
WtB, WtC--- Woodbridge	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		Acres	Acres	Acres	Acres
I	455	---	---	---	---
II	41,045	16,160	12,390	12,495	---
III	34,885	12,175	6,890	15,820	---
IV	10,015	2,740	---	7,275	---
V	12,850	---	12,850	---	---
VI	57,545	---	---	57,545	---
VII	65,510	---	---	65,510	---
VIII	---	---	---	---	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
AgA, AgB, AgC--- Agawam	4o	Slight	Slight	Slight	Slight	Eastern white pine-- Red pine--- Northern red oak--- Sugar maple---	70 70 65 ---	Eastern white pine, red pine, white spruce, Norway spruce.
AmB*:								
Amostown---	3o	Slight	Slight	Slight	Slight	Eastern white pine-- Northern red oak--- Sugar maple---	75 70 65	Eastern white pine, white spruce, red pine, eastern hemlock.
Belgrade---	3o	Slight	Slight	Slight	Slight	Eastern white pine-- White spruce--- Northern red oak---	75 65 62	Eastern white pine, red pine, European larch, white spruce.
CaB, CaC, CbB, CbC- Canton	5o	Slight	Slight	Slight	Slight	Eastern white pine-- Northern red oak---	58 52	Eastern white pine, white spruce.
CcB, CcC, CcD, CcE- Canton	5x	Slight	Moderate	Slight	Slight	Eastern white pine-- Northern red oak---	58 52	Eastern white pine, white spruce.
ChC*, ChD*:								
Chatfield---	3x	Slight	Moderate	Slight	Slight	Sugar maple--- Northern red oak--- White ash---	65 70 75	Eastern white pine, red pine, European larch, Norway spruce.
Hollis---	5x	Slight	Moderate	Severe	Moderate	Northern red oak--- Eastern white pine-- Sugar maple---	47 55 56	Eastern white pine.
Rock outcrop.								
De--- Deerfield	4s	Slight	Slight	Moderate	Slight	Eastern white pine-- Northern red oak---	65 55	Eastern white pine, red pine, European larch.
Fm--- Freetown	5w	Slight	Severe	Severe	Severe	Red maple--- Atlantic white-cedar Eastern hemlock--- Green ash--- American elm--- Red spruce--- Balsam fir---	50 60 55 35 55 50 45	White spruce, eastern hemlock, balsam fir.
HaA--- Hadley	3o	Slight	Slight	Slight	Slight	Eastern white pine-- Sugar maple--- Red pine---	70 63 70	Eastern white pine, red pine, black walnut, European larch.
HgA, HgB, HgC--- Hinckley	5s	Slight	Slight	Severe	Slight	Northern red oak--- Eastern white pine-- Red pine--- Sugar maple---	49 60 58 57	Eastern white pine, red pine, European larch.
HgD, HgE--- Hinckley	5s	Slight	Moderate	Severe	Slight	Northern red oak--- Eastern white pine-- Red pine--- Sugar maple---	49 60 58 57	Eastern white pine, red pine, European larch.
HkB, HkC--- Hinckley	5s	Slight	Slight	Severe	Slight	Northern red oak--- Eastern white pine-- Red pine--- Sugar maple---	49 60 58 57	Eastern white pine, red pine, European larch.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
HuC*: Hinckley	5s	Slight	Slight	Severe	Slight	Northern red oak Eastern white pine Red pine Sugar maple	49 60 58 57	Eastern white pine, red pine, European larch.
Urban land.								
HwB Hinesburg	4o	Slight	Slight	Slight	Slight	Eastern white pine Northern red oak	65 60	Eastern white pine, red pine.
Lm Limerick	4w	Slight	Severe	Severe	Severe	Eastern white pine Red maple	65 ---	Eastern white pine, white spruce, northern white-cedar.
MeA, MeB, MeC Merrimac	4s	Slight	Slight	Moderate	Slight	Northern red oak Eastern white pine Sugar maple	51 64 58	Eastern white pine, red pine.
MeD Merrimac	4s	Slight	Moderate	Moderate	Slight	Northern red oak Eastern white pine Sugar maple	51 64 58	Eastern white pine, red pine.
NgA Ninigret	3o	Slight	Slight	Slight	Slight	Red pine Eastern white pine Red maple Northern red oak Sugar maple	71 75 60 65 55	Eastern white pine, white spruce.
PaB, PaC Paxton	3o	Slight	Slight	Moderate	Slight	Northern red oak Red pine Eastern white pine Sugar maple	65 67 66 75	Red pine, eastern white pine, Norway spruce, European larch.
PaD Paxton	3r	Moderate	Moderate	Moderate	Slight	Northern red oak Red pine Eastern white pine Sugar maple	65 67 66 75	Red pine, eastern white pine, Norway spruce, European larch.
PbB, PbC Paxton	3o	Slight	Slight	Moderate	Slight	Northern red oak Red pine Eastern white pine Sugar maple	65 67 66 75	Red pine, eastern white pine, Norway spruce, European larch.
PbD Paxton	3r	Moderate	Moderate	Moderate	Slight	Northern red oak Red pine Eastern white pine Sugar maple	65 67 66 75	Red pine, eastern white pine, Norway spruce, European larch.
PcB, PcC Paxton	3x	Slight	Moderate	Moderate	Slight	Northern red oak Red pine Eastern white pine Sugar maple	65 67 66 75	Red pine, eastern white pine, Norway spruce, European larch.
PcD, PcE Paxton	3x	Moderate	Moderate	Moderate	Slight	Northern red oak Red pine Eastern white pine Sugar maple	65 67 66 75	Red pine, eastern white pine, Norway spruce, European larch.
PdC*: Paxton	3o	Slight	Slight	Moderate	Slight	Northern red oak Red pine Eastern white pine Sugar maple	65 67 66 75	Red pine, eastern white pine, Norway spruce, European larch.
Urban land.								

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
PoB, PoC---------- Poquonock	4s	Slight	Slight	Moderate	Moderate	Eastern white pine--	60	Eastern white pine, European larch.
						Northern red oak----	60	
						Shagbark hickory----	---	
PsB---------- Poquonock	4s	Slight	Slight	Moderate	Moderate	Eastern white pine--	60	Eastern white pine, European larch, eastern white pine, European larch.
						Northern red oak----	60	
						Shagbark hickory----	---	
QnA, QnB, QnC------ Quonset	5s	Slight	Slight	Severe	Slight	Eastern white pine--	61	Eastern white pine, red pine.
						Northern red oak----	47	
						Red pine----------	60	
						Sugar maple---------	52	
QnD---------- Quonset	5s	Slight	Moderate	Severe	Slight	Eastern white pine--	61	Eastern white pine, red pine.
						Northern red oak----	47	
						Red pine----------	60	
						Sugar maple---------	52	
Ra---------- Raynham	4w	Slight	Severe	Severe	Severe	Eastern white pine--	65	Eastern white pine, white spruce, northern white-cedar.
						White spruce--------	55	
						Red spruce----------	45	
						Red maple-----------	---	
RdA, RdB---------- Ridgebury	4w	Slight	Severe	Severe	Severe	Northern red oak----	57	Eastern white pine, white spruce.
						Red spruce----------	47	
						Eastern white pine--	63	
						Sugar maple---------	52	
RsA, RsB---------- Ridgebury	4x	Slight	Severe	Severe	Severe	Northern red oak----	57	Eastern white pine, white spruce.
						Red spruce----------	47	
						Eastern white pine--	63	
						Sugar maple---------	52	
Sa---------- Saco	5w	Slight	Severe	Severe	Severe	Eastern white pine--	50	
						Red maple-----------	50	
						Northern white-cedar	45	
Sc---------- Scarboro	5w	Slight	Severe	Severe	Severe	Eastern white pine--	55	Northern white-cedar.
						Red maple-----------	55	
						Atlantic white-cedar	45	
SdA, SdB---------- Sudbury	4o	Slight	Slight	Slight	Slight	Eastern white pine--	60	Eastern white pine, red pine, European larch, white spruce, Norway spruce.
						Northern red oak----	45	
						Red spruce----------	47	
						Red pine----------	60	
Su---------- Suncook	5s	Slight	Slight	Severe	Slight	Eastern white pine--	55	Eastern white pine, red pine.
						Black oak-----------	50	
						Northern red oak----	50	
						Red maple-----------	50	
Sw---------- Swansea	4w	Slight	Severe	Severe	Severe	Red maple-----------	50	White spruce, eastern hemlock, balsam fir.
						Atlantic white-cedar	60	
						Eastern hemlock-----	55	
						Green ash-----------	35	
						American elm--------	55	
						Red spruce----------	50	
						Balsam fir----------	45	
Wa---------- Walpole	4w	Slight	Severe	Severe	Severe	Eastern white pine--	68	Eastern white pine, white spruce, northern white-cedar, Norway spruce.
						Red maple-----------	75	
						White ash-----------	61	
						Eastern hemlock-----	54	
Wg---------- Whitman	5w	Slight	Severe	Severe	Severe	Eastern white pine--	56	
						Red spruce----------	44	
						Red maple-----------	55	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
Wh---------- Whitman	5x	Slight	Severe	Severe	Severe	Eastern white pine-- Red spruce---------- Red maple----------	56 44 55	
WnA, WnB, WnC------ Windsor	5s	Slight	Slight	Severe	Slight	Eastern white pine-- Northern red oak----- Red pine---------- Sugar maple----------	57 52 61 55	Eastern white pine, red pine.
WnD---------- Windsor	5s	Slight	Moderate	Severe	Slight	Eastern white pine-- Northern red oak----- Red pine---------- Sugar maple----------	57 52 61 55	Eastern white pine, red pine.
Wo---------- Winooski	3o	Slight	Slight	Slight	Slight	Northern red oak---- Eastern white pine-- White spruce-------- Sugar maple----------	70 75 70 65	Eastern white pine, red pine, European larch.
WrA, WrB, WrC------ Woodbridge	3o	Slight	Slight	Slight	Moderate	Eastern white pine-- Northern red oak----- Red pine---------- Red spruce---------- Sugar maple----------	67 72 65 50 65	Eastern white pine, European larch.
WsB, WsC---------- Woodbridge	3o	Slight	Slight	Slight	Moderate	Eastern white pine-- Northern red oak----- Red pine---------- Red spruce---------- Sugar maple----------	67 72 65 50 65	Eastern white pine, red pine, European larch.
WtB, WtC---------- Woodbridge	3x	Moderate	Moderate	Slight	Moderate	Eastern white pine-- Northern red oak----- Red pine---------- Red spruce---------- Sugar maple----------	67 72 65 50 65	Eastern white pine, red pine, European larch.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AgA Agawam	Slight	Slight	Slight	Slight	Slight.
AgB Agawam	Slight	Slight	Moderate: slope.	Slight	Slight.
AgC Agawam	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
AmB*: Amostown	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Belgrade	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Severe: erodes easily.	Moderate: wetness.
CaB Canton	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
CaC Canton	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
CbB Canton	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Slight	Moderate: large stones.
CbC Canton	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope, large stones.	Slight	Moderate: large stones, slope.
CcB Canton	Severe: large stones.	Severe: large stones.	Severe: large stones.	Slight	Moderate: large stones.
CcC Canton	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Slight	Moderate: large stones, slope.
CcD Canton	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.	Moderate: slope.	Severe: slope.
CcE Canton	Severe: slope, large stones.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Severe: slope.
ChC*: Chatfield	Severe: large stones.	Severe: large stones.	Severe: large stones, slope, small stones.	Slight	Moderate: small stones, large stones, slope.
Hollis	Severe: large stones, depth to rock.	Severe: large stones, depth to rock.	Severe: large stones, slope, depth to rock.	Slight	Severe: thin layer.
Rock outcrop.					

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
ChD*: Chatfield	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Moderate: slope.	Severe: slope.
Hollis	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, depth to rock.	Moderate: slope.	Severe: slope, thin layer.
Rock outcrop.					
De Deerfield	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight	Moderate: wetness.
Fm Freetown	Severe: excess humus, wetness.	Severe: excess humus,	Severe: excess humus,	Severe: excess humus,	Severe: excess humus,
Fp Freetown	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
HaA Hadley	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
HgA Hinckley	Slight	Slight	Moderate: small stones.	Slight	Severe: droughty.
HgB Hinckley	Slight	Slight	Moderate: slope, small stones.	Slight	Severe: droughty.
HgC Hinckley	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Severe: droughty.
HgD Hinckley	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: droughty, slope.
HgE Hinckley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
HkB Hinckley	Moderate: large stones, small stones.	Moderate: small stones, large stones.	Severe: large stones, small stones.	Slight	Severe: small stones, droughty.
HkC Hinckley	Moderate: slope, large stones, small stones.	Moderate: slope, small stones, large stones.	Severe: slope, large stones, small stones.	Slight	Severe: small stones, droughty.
HuC*: Hinckley	Slight	Slight	Severe: slope.	Slight	Severe: droughty.
Urban land.					
HwB Hinesburg	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Moderate: droughty.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Lm---------- Limerick	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: flooding, wetness.
MeA---------- Merrimac	Slight----------	Slight----------	Moderate: small stones.	Slight----------	Slight.
MeB---------- Merrimac	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
MeC---------- Merrimac	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope.
MeD---------- Merrimac	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
NgA---------- Ninigret	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
PaB---------- Paxton	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight----------	Slight.
PaC---------- Paxton	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
PaD---------- Paxton	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
PbB---------- Paxton	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Slight----------	Moderate: large stones.
PbC---------- Paxton	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Slight----------	Moderate: large stones, slope.
PbD---------- Paxton	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: slope.	Severe: slope.
PcB---------- Paxton	Severe: large stones.	Severe: large stones.	Severe: large stones.	Slight----------	Moderate: large stones.
PcC---------- Paxton	Severe: large stones.	Severe: large stones.	Severe: large stones, slope.	Slight----------	Moderate: large stones, slope.
PcD---------- Paxton	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Moderate: slope.	Severe: slope.
PcE---------- Paxton	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.	Severe: slope.	Severe: slope.
PdC*: Paxton----------	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----------	Moderate: slope.
Urban land.					

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Pg*, Pm*. Pits					
PoB---- Poquonock	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight----	Slight.
PoC---- Poquonock	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight----	Moderate: slope.
PsB---- Poquonock	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Slight----	Moderate: large stones.
QnA---- Quonset	Slight----	Slight----	Moderate: small stones.	Severe: slope.	Severe: droughty.
QnB---- Quonset	Slight----	Slight----	Moderate: slope, small stones.	Severe: slope.	Severe: droughty.
QnC---- Quonset	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: slope.	Severe: droughty.
QnD---- Quonset	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
Ra---- Raynham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
RdA, RdB---- Ridgebury	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
RsA, RsB---- Ridgebury	Severe: large stones, wetness, percs slowly.	Severe: large stones, wetness, percs slowly.	Severe: wetness, large stones, small stones.	Severe: wetness.	Severe: wetness.
Sa---- Saco	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus.	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus.	Severe: flooding, wetness.
Sc---- Scarboro	Severe: ponding, excess humus, too sandy.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, excess humus.
SdA---- Sudbury	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, small stones.	Slight----	Slight.
SdB---- Sudbury	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness, small stones.	Slight----	Slight.
Su---- Suncook	Severe: flooding.	Slight----	Moderate: flooding.	Slight----	Moderate: droughty, flooding.
Sw---- Swansea	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and Trails	Golf fairways
Ud*. Udorthents					
Ur*. Urban land					
Wa---------- Walpole	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Wg---------- Whitman	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Wh---------- Whitman	Severe: large stones, ponding.	Severe: large stones, ponding.	Severe: ponding, large stones.	Severe: ponding.	Severe: large stones, ponding.
WnA---------- Windsor	Slight----------	Slight----------	Slight----------	Slight----------	Moderate: droughty.
WnB---------- Windsor	Slight----------	Slight----------	Moderate: slope.	Slight----------	Moderate: droughty.
WnC---------- Windsor	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight----------	Moderate: slope, droughty.
WnD---------- Windsor	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Wo---------- Winooski	Severe: flooding.	Moderate: wetness.	Moderate: flooding, wetness.	Slight----------	Moderate: wetness, flooding.
WrA---------- Woodbridge	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
WrB---------- Woodbridge	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
WrC---------- Woodbridge	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope.
WsB---------- Woodbridge	Moderate: large stones, wetness.	Moderate: wetness, large stones.	Severe: large stones.	Moderate: wetness.	Moderate: large stones, wetness.
WsC---------- Woodbridge	Moderate: slope, large stones, wetness.	Moderate: slope, wetness, large stones.	Severe: large stones, slope.	Moderate: wetness.	Moderate: large stones, wetness, slope.
WtB---------- Woodbridge	Severe: large stones.	Severe: large stones.	Severe: large stones.	Moderate: wetness.	Moderate: large stones, wetness.
WtC---------- Woodbridge	Severe: large stones.	Severe: large stones.	Severe: large stones, slope.	Moderate: wetness.	Moderate: large stones, wetness, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AgA---- Agawam	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
AgB---- Agawam	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
AgC---- Agawam	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
AmB*:											
Amostown----	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Belgrade----	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
CaB---- Canton	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
CaC---- Canton	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
CtB---- Canton	Very poor.	Poor	Good	Good	Good	---	Poor	Very poor.	Poor	Good	Very poor.
CbC---- Canton	Very poor.	Poor	Good	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
CcB---- Canton	Very poor.	Very poor.	Good	Good	Good	---	Poor	Very poor.	Poor	Fair	Very poor.
CcC, CcD, CcE---- Canton	Very poor.	Very poor.	Good	Good	Good	---	Very poor.	Very poor.	Poor	Fair	Very poor.
ChC*, ChD*:											
Chatfield----	Very poor.	Very poor.	Good	Fair	Fair	---	Very poor.	Very poor.	Very poor.	Fair	Very poor.
Hollis----	Very poor.	Very poor.	Fair	Poor	Poor	---	Very poor.	Very poor.	Very poor.	Poor	Very poor.
Rock outcrop.											
De---- Deerfield	Poor	Fair	Fair	Poor	Poor	---	Poor	Poor	Fair	Poor	Poor
Fm---- Freetown	Very poor.	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good
Fp---- Freetown	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Good	Good	Very poor.	Very poor.	Good
HaA---- Hadley	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
HgA, HgB, HgC, HgD- Hinckley	Poor	Poor	Poor	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.
HgE---- Hinckley	Very poor.	Poor	Poor	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.
HkB, HkC---- Hinckley	Very poor.	Poor	Fair	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
HuC*: Hinckley	Poor	Poor	Poor	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.
Urban land.											
HwB--- Hinesburg	Poor	Fair	Good	Good	Good	---	Poor	Very poor.	Fair	Good	Very poor.
Lm--- Limerick	Poor	Fair	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good
MeA, MeB, MeC--- Merrimac	Fair	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
MeD--- Merrimac	Poor	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
NgA--- Ninigret	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor
PaB--- Paxton	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
PaC--- Paxton	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
PaD--- Paxton	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
PbB--- Paxton	Very poor.	Poor	Good	Good	Good	---	Poor	Very poor.	Poor	Good	Very poor.
PbC, PbD--- Paxton	Very poor.	Poor	Good	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
PcB--- Paxton	Very poor.	Very poor.	Good	Good	Good	---	Poor	Very poor.	Poor	Fair	Very poor.
PcC, PcD, PcE--- Paxton	Very poor.	Very poor.	Good	Good	Good	---	Very poor.	Very poor.	Poor	Fair	Very poor.
PdC*: Paxton---	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Urban land.											
Pg*, Pm*. Pits											
PoB--- Poquonock	Fair	Fair	Good	Fair	Fair	---	Poor	Very poor.	Fair	Fair	Very poor.
PoC--- Poquonock	Fair	Fair	Good	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
PsB--- Poquonock	Very poor.	Poor	Good	Fair	Fair	---	Poor	Very poor.	Poor	Fair	Very poor.
QnA, QnB, QnC, QnD--- Quonset	Very poor.	Poor	Poor	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.
Ra--- Raynham	Fair	Fair	Fair	Fair	Fair	---	Good	Fair	Fair	Fair	Fair

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
RdA---- Ridgebury	Poor	Poor	Fair	Fair	Fair	---	Good	Fair	Poor	Fair	Fair
RdB---- Ridgebury	Poor	Poor	Fair	Fair	Fair	---	Poor	Very poor.	Poor	Fair	Very poor.
RsA---- Ridgebury	Very poor.	Very poor.	Fair	Fair	Fair	---	Good	Fair	Poor	Fair	Fair
RsB---- Ridgebury	Very poor.	Very poor.	Fair	Fair	Fair	---	Poor	Very poor.	Poor	Fair	Very poor.
Sa---- Saco	Very poor.	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good
Sc---- Scarboro	Very poor.	Poor	Poor	Poor	Poor	---	Good	Fair	Poor	Poor	Fair
SdA---- Sudbury	Fair	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor
SdB---- Sudbury	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Su---- Suncook	Poor	Fair	Fair	Poor	Poor	---	Very poor.	Very poor.	Fair	Poor	Very poor.
Sw---- Swansea	Very poor.	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good
Ud*. Udorthents											
Ur*. Urban land											
Wa---- Walpole	Poor	Fair	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good
Wg---- Whitman	Very poor.	Poor	Poor	Poor	Poor	---	Good	Fair	Poor	Poor	Fair
Wh---- Whitman	Very poor.	Very poor.	Poor	Poor	Poor	---	Good	Fair	Very poor.	Poor	Fair
WnA, WnB, WnC, WnD- Windsor	Poor	Poor	Fair	Poor	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.
Wo---- Winooski	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor
WrA---- Woodbridge	Fair	Good	Good	Good	Fair	---	Poor	Poor	Good	Good	Poor
WrB---- Woodbridge	Fair	Good	Good	Good	Fair	---	Poor	Very poor.	Good	Good	Very poor.
WrC---- Woodbridge	Fair	Good	Good	Good	Fair	---	Very poor.	Very poor.	Good	Good	Very poor.
WsB---- Woodbridge	Very poor.	Poor	Good	Good	Fair	---	Poor	Very poor.	Poor	Good	Very poor.
WsC---- Woodbridge	Very poor.	Poor	Good	Good	Fair	---	Very poor.	Very poor.	Poor	Good	Very poor.

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
WtB---------- Woodbridge	Very poor.	Very poor.	Good	Good	Fair	---	Poor	Very poor.	Fair	Good	Very poor.
WtC---------- Woodbridge	Very poor.	Very poor.	Good	Good	Fair	---	Very poor.	Very poor.	Fair	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AgA---------- Agawam	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
AgB---------- Agawam	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
AgC---------- Agawam	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
AmB*: Amostown----------	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Moderate: frost action, low strength, wetness.	Moderate: wetness.
Belgrade----------	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Severe: frost action.	Moderate: wetness.
CaB---------- Canton	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
CaC---------- Canton	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
CbB---------- Canton	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: large stones.
CbC---------- Canton	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, slope.
CcB---------- Canton	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: large stones.
CcC---------- Canton	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, slope.
CcD, CcE---------- Canton	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
ChC*: Chatfield--------	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: slope, depth to rock, frost action.	Moderate: small stones, large stones, slope.
Hollis---------- Rock outcrop.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: thin layer.
ChD*: Chatfield--------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hollis---------- Rock outcrop.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, thin layer.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
De---------- Deerfield	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: frost action, wetness.	Moderate: wetness.
Fm---------- Freetown	Severe: wetness, excess humus.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength, frost action.	
Fp---------- Freetown	Severe: ponding, excess humus.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, low strength, frost action.	Severe: ponding, excess humus.
HaA---------- Hadley	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action.	Moderate: flooding.
HgA---------- Hinckley	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Severe: droughty.
HgB---------- Hinckley	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Severe: droughty.
HgC---------- Hinckley	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
HgD, HgE---------- Hinckley	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
HkB---------- Hinckley	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Severe: small stones, droughty.
HkC---------- Hinckley	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: small stones, droughty.
HuC*: Hinckley--------- Urban land.	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Severe: droughty.
HwB---------- Hinesburg	Severe: cutbanks cave.	Slight---------	Moderate: wetness.	Moderate: slope.	Moderate: frost action.	Moderate: droughty.
Lm---------- Limerick	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness, frost action.	Severe: flooding, wetness.
MeA---------- Merrimac	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
MeB---------- Merrimac	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Slight.
MeC---------- Merrimac	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
MeD---------- Merrimac	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
NgA---------- Ninigret	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: frost action, wetness.	Moderate: wetness.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
PaB---- Paxton	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Slight.
PaC---- Paxton	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: slope.
PaD---- Paxton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PbB---- Paxton	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: large stones.
PbC---- Paxton	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: large stones, slope.
PbD---- Paxton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PcB---- Paxton	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness, frost action.	Moderate: large stones.
PcC---- Paxton	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: large stones, slope.
PcD, PcE---- Paxton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PdC*: Paxton----	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope, frost action.	Moderate: slope.
Urban land.						
Pg*, Pm*. Pits						
PoB---- Poquonock	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Slight.
PoC---- Poquonock	Moderate: dense layer, wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: wetness, slope.	Moderate: slope.
PsB---- Poquonock	Moderate: dense layer, wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: large stones.
QnA---- Quonset	Severe: cutbanks cave.	Slight----------	Slight----------	Slight----------	Slight----------	Severe: droughty.
QnB---- Quonset	Severe: cutbanks cave.	Slight----------	Slight----------	Moderate: slope.	Slight----------	Severe: droughty.
QnC---- Quonset	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
QnD---- Quonset	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
Ra---- Raynham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action, wetness.	Severe: wetness.
RdA, RdB, RsA, RsB---- Ridgebury	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
Sa---- Saco	Severe: wetness, cutbanks cave.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness, frost action.	Severe: flooding, wetness.
Sc---- Scarboro	Severe: cutbanks cave, excess humus, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding, excess humus.
SdA---- Sudbury	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, frost action.	Slight.
SdB---- Sudbury	Severe: wetness, cutbanks cave.	Moderate: wetness.	Severe: wetness.	Moderate: slope, wetness.	Moderate: wetness, frost action.	Slight.
Su---- Suncook	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: droughty, flooding.
Sw---- Swansea	Severe: wetness, excess humus, cutbanks cave.	Severe: wetness, low strength.	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, low strength, frost action.	Severe: wetness, excess humus.
Ud*. Udorthents						
Ur*. Urban land						
Wa---- Walpole	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
Wg---- Whitman	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
Wh---- Whitman	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: frost action, ponding.	Severe: large stones, ponding.
WnA---- Windsor	Severe: cutbanks cave.	Slight----------	Slight----------	Slight----------	Slight----------	Moderate: droughty.
WnB---- Windsor	Severe: cutbanks cave.	Slight----------	Slight----------	Moderate: slope.	Slight----------	Moderate: droughty.
WnC---- Windsor	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope, droughty.

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
WnD---------- Windsor	Severe: slope, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wo---------- Winooski	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding, frost action.	Moderate: wetness, flooding.
WrA---------- Woodbridge	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: frost action.	Moderate: wetness.
WrB---------- Woodbridge	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: wetness.
WrC---------- Woodbridge	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: wetness, slope.
WsB---------- Woodbridge	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: large stones, wetness.
WsC---------- Woodbridge	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: large stones, wetness, slope.
WtB---------- Woodbridge	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Moderate: large stones, wetness.
WtC---------- Woodbridge	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: frost action.	Moderate: large stones, wetness, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AgA, AgB---------- Agawam	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
AgC---------- Agawam	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
AmB*:					
Amostown----------	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness.	Severe: wetness, seepage.	Fair: wetness.
Belgrade----------	Severe: wetness, percs slowly.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Fair: wetness.
CaB---------- Canton	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
CaC---------- Canton	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
CbB---------- Canton	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
CbC---------- Canton	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
CcB---------- Canton	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
CcC---------- Canton	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
CcD, CcE---------- Canton	Severe: poor filter, slope.	Severe: slope, seepage.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, small stones, slope.
ChC*:					
Chatfield----------	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim.
Hollis----------	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, thin layer.
Rock outcrop.					

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
ChD*: Chatfield	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, slope.
Hollis	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, thin layer, slope.
Rock outcrop.					
De Deerfield	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, seepage.
Pm Freetown	Severe: wetness.	Severe: wetness, excess humus, seepage.	Severe: wetness, excess humus, seepage.	Severe: wetness, seepage.	Poor: excess humus, wetness.
Pp Freetown	Severe: ponding.	Severe: ponding, excess humus, seepage.	Severe: ponding, excess humus, seepage.	Severe: ponding, seepage.	Poor: ponding, excess humus.
HaA Hadley	Severe: flooding.	Severe: flooding, seepage.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Good.
HgA, HgB Hinckley	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage, small stones.
HgC Hinckley	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage, small stones.
HgD, HgE Hinckley	Severe: slope, poor filter.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: slope, too sandy, seepage.
HkB Hinckley	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage, small stones.
HkC Hinckley	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage, small stones.
HuC*: Hinckley	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage, small stones.
Urban land.					

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
HwB---------- Hinesburg	Severe: percs slowly, poor filter.	Severe: seepage.	Severe: wetness.	Severe: seepage.	Fair: too clayey.
Lm---------- Limerick	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
MeA, MeB---------- Merrimac	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
MeC---------- Merrimac	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
MeD---------- Merrimac	Severe: slope, poor filter.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Severe: slope, seepage.	Poor: slope, seepage, too sandy.
NgA---------- Ninigret	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: seepage, too sandy, small stones.
PaB---------- Paxton	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
PaC---------- Paxton	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
PaD---------- Paxton	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PbB---------- Paxton	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
PbC---------- Paxton	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
PbD---------- Paxton	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PcB---------- Paxton	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
PcC---------- Paxton	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
PcD, PcE---------- Paxton	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
PdC*: Paxton	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
Urban land.					
Pg*, Pm*. Pits					
PoB Poquonock	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
PoC Poquonock	Severe: percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
PsB Poquonock	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: small stones, wetness.
QnA, QnB Quonset	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
QnC Quonset	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
QnD Quonset	Severe: poor filter, slope.	Severe: slope, seepage.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
Ra Raynham	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
RdA Ridgebury	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
RdB Ridgebury	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
RsA Ridgebury	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
RsB Ridgebury	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Sa Saco	Severe: flooding, wetness, poor filter.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness.	Poor: wetness.
Sc Scarboro	Severe: ponding, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SdA, SdB---------- Sudbury	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: seepage, too sandy, small stones.
Su---------- Suncook	Severe: flooding, poor filter.	Severe: flooding, seepage.	Severe: flooding, seepage, too sandy.	Severe: seepage, flooding.	Poor: seepage, too sandy.
Sw---------- Swansea	Severe: wetness, poor filter.	Severe: wetness, excess humus, seepage.	Severe: wetness, too sandy, seepage.	Severe: wetness, seepage.	Poor: wetness, excess humus, seepage.
Ud*. Udorthents					
Ur*. Urban land					
Wa---------- Walpole	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Wg, Wh---------- Whitman	Severe: percs slowly, ponding.	Slight----------	Severe: ponding.	Severe: ponding.	Poor: ponding.
WnA, WnB---------- Windsor	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Poor: too sandy, seepage.	Poor: too sandy, seepage.
WnC---------- Windsor	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage, too sandy.	Poor: too sandy, seepage.	Poor: too sandy, seepage.
WnD---------- Windsor	Severe: slope, poor filter.	Severe: slope, seepage.	Severe: slope, seepage, too sandy.	Poor: slope, too sandy, seepage.	Poor: slope, too sandy, seepage.
Wo---------- Winooski	Severe: flooding, wetness.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Severe: flooding, wetness, seepage.	Fair: wetness.
WrA---------- Woodbridge	Severe: wetness, percs slowly.	Slight----------	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
WrB---------- Woodbridge	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
WrC---------- Woodbridge	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
WsB---------- Woodbridge	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
WsC---------- Woodbridge	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.
WtB---------- Woodbridge	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: small stones, wetness.
WtC---------- Woodbridge	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: small stones, slope, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AgA, AgB, AgC--------- Agawam	Good----------	Probable----------	Probable----------	Poor: too sandy, area reclaim.
AmB*: Amostown----------	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Belgrade----------	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
CaB, CaC---------- Canton	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
CbB, CbC, CcB, CcC---- Canton	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
CcD---------- Canton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
CcE---------- Canton	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
ChC*: Chatfield----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Hollis----------	Poor: area reclaim, thin layer.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: area reclaim.
Rock outcrop.				
ChD*: Chatfield----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Hollis----------	Poor: area reclaim, thin layer.	Improbable: excess fines, thin layer.	Improbable: excess fines, thin layer.	Poor: area reclaim, slope.
Rock outcrop.				
De---------- Deerfield	Fair: wetness.	Probable----------	Improbable: excess fines.	Poor: too sandy, thin layer.
Fm---------- Freetown	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
Fp---------- Freetown	Poor: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
HaA---- Hadley	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
HgA, HgB, HgC---- Hinckley	Good----	Probable----	Probable----	Poor: too sandy, area reclaim, small stones.
HgD---- Hinckley	Fair: slope.	Probable----	Probable----	Poor: slope, too sandy, small stones.
HgE---- Hinckley	Poor: slope.	Probable----	Probable----	Poor: slope, too sandy, small stones.
HkB, HkC---- Hinckley	Good----	Probable----	Probable----	Poor: small stones, too sandy, area reclaim.
HuC*: Hinckley----	Good----	Probable----	Probable----	Poor: too sandy, area reclaim, small stones.
Urban land.				
HwB---- Hinesburg	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
Lm---- Limerick	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
MeA, MeB, MeC---- Merrimac	Good----	Probable----	Probable----	Poor: small stones, area reclaim.
MeD---- Merrimac	Fair: slope.	Probable----	Probable----	Poor: slope, small stones, area reclaim.
NgA---- Ninigret	Fair: wetness.	Probable----	Probable----	Poor: area reclaim.
PaB---- Paxton	Good----	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
PaC---- Paxton	Good----	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
PaD---- Paxton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
PbB---- Paxton	Good----	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
PbC---------- Paxton	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
PbD---------- Paxton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
PcB---------- Paxton	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
PcC---------- Paxton	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
PcD---------- Paxton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
PcE---------- Paxton	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
PdC*: Paxton----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
Urban land.				
Pg*, Pm*. Pits				
PoB---------- Poquonock	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too sandy.
PoC---------- Poquonock	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too sandy, slope.
PsB---------- Poquonock	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, too sandy.
QnA, QnB, QnC---------- Quonset	Good----------	Probable----------	Probable----------	Poor: small stones, area reclaim.
QnD---------- Quonset	Fair: slope.	Probable----------	Probable----------	Poor: small stones, area reclaim, slope.
Ra---------- Raynham	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
RdA, RdB, RsA, RsB----- Ridgebury	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, small stones, area reclaim.
Sa---------- Saco	Poor: wetness.	Probable----------	Improbable: too sandy.	Poor: wetness.
Sc---------- Scarboro	Poor: wetness.	Probable----------	Improbable: too sandy.	Poor: too sandy, ponding.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
SdA, SdB---------- Sudbury	Fair: wetness.	Probable----------	Probable----------	Poor: small stones, too sandy, area reclaim.
Su---------- Suncook	Good----------	Probable----------	Improbable: too sandy.	Poor: too sandy.
Sw---------- Swansea	Poor: wetness.	Probable----------	Improbable: excess fines.	Poor: wetness, excess humus.
Ud*. Udorthents				
Ur*. Urban land				
Wa---------- Walpole	Poor: wetness.	Probable----------	Probable----------	Poor: wetness, small stones.
Wg---------- Whitman	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, small stones, area reclaim.
Wh---------- Whitman	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, large stones, area reclaim.
WnA, WnB, WnC---------- Windsor	Good----------	Probable----------	Improbable: excess fines.	Poor: too sandy.
WnD---------- Windsor	Fair: slope.	Probable----------	Improbable: excess fines.	Poor: slope, too sandy.
Wo---------- Winooski	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
WrA, WrB---------- Woodbridge	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
WrC---------- Woodbridge	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
WsB---------- Woodbridge	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
WsC---------- Woodbridge	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
WtB---------- Woodbridge	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
WtC---------- Woodbridge	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
AgA---------- Agawam	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Favorable------	Favorable.
AgB---------- Agawam	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope----------	Favorable.
AgC---------- Agawam	Severe: slope, seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope----------	Slope.
AmB*: Amostown---------	Moderate: slope.	Wetness, percs slowly, slope.	Severe: slow refill.	Percs slowly, slope.	Wetness, percs slowly, slope.	Erodes easily, percs slowly.
Belgrade---------	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave, slow refill.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Erodes easily, percs slowly.
CaB---------- Canton	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope----------	Favorable.
CaC---------- Canton	Severe: slope, seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope----------	Slope.
CbB---------- Canton	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope----------	Large stones.
CbC---------- Canton	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope----------	Large stones, slope.
CcB---------- Canton	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope----------	Large stones.
CcC, CcD, CcE----- Canton	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope----------	Large stones, slope.
ChC*: Chatfield--------	Severe: slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, depth to rock, slope.	Slope, droughty, depth to rock.
Hollis----------	Severe: depth to rock.	Severe: thin layer, piping.	Severe: no water.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.
Rock outcrop.						
ChD*: Chatfield--------	Severe: slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, depth to rock, slope.	Slope, droughty, depth to rock.
Hollis----------	Severe: depth to rock, slope.	Severe: thin layer, piping.	Severe: no water.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.
Rock outcrop.						
De---------- Deerfield	Severe: seepage.	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty.	Droughty.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
Pm---------- Freetown	Severe: seepage.	Severe: excess humus, wetness.	Slight---------	Frost action---	Wetness--------	Wetness.
Pp---------- Freetown	Severe: seepage.	Severe: excess humus, ponding.	Slight---------	Frost action, ponding.	Ponding--------	Wetness.
HaA---------- Hadley	Severe: seepage.	Severe: piping.	Moderate: deep to water.	Deep to water	Flooding, erodes easily.	Erodes easily.
HgA---------- Hinckley	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake.	Large stones, droughty.
HgB---------- Hinckley	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Large stones, droughty.
HgC, HgD, HgE----- Hinckley	Severe: slope, seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Large stones, droughty, slope.
HkB---------- Hinckley	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones, droughty.	Large stones, droughty.
HkC---------- Hinckley	Severe: slope, seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, large stones, droughty.	Slope, large stones, droughty.
HuC*: Hinckley---------	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Large stones, droughty.
Urban land.						
HwB---------- Hinesburg	Severe: seepage.	Severe: piping.	Severe: no water.	Slope, cutbanks cave.	Droughty, fast intake, slope.	Erodes easily, droughty.
Lm---------- Limerick	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding, frost action.	Wetness, flooding, erodes easily.	Wetness, erodes easily.
MeA---------- Merrimac	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Favorable------	Favorable.
MeB---------- Merrimac	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope----------	Favorable.
MeC, MeD---------- Merrimac	Severe: slope, seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope----------	Slope.
NgA---------- Ninigret	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness--------	Favorable.
PaB---------- Paxton	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Percs slowly, rooting depth, slope.	Rooting depth, percs slowly.
PaC, PaD---------- Paxton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Percs slowly, rooting depth, slope.	Slope, rooting depth, percs slowly.
PbB---------- Paxton	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Percs slowly, rooting depth, slope.	Rooting depth, percs slowly.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
PbC, PbD---------- Paxton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Percs slowly, rooting depth, slope.	Slope, rooting depth, percs slowly.
PcB---------- Paxton	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Percs slowly, rooting depth, slope.	Rooting depth, percs slowly.
PcC, PcD, PcE----- Paxton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Percs slowly, rooting depth, slope.	Slope, rooting depth, percs slowly.
PdC*: Paxton----------	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Percs slowly, rooting depth, slope.	Slope, rooting depth, percs slowly.
Urban land.						
Pg*, Pm*. Pits						
PoB---------- Poquonock	Moderate: slope.	Moderate: piping.	No water-------	Deep to water	Percs slowly, rooting depth, slope.	Rooting depth, percs slowly.
PoC---------- Poquonock	Severe: slope.	Moderate: piping.	No water-------	Deep to water	Percs slowly, rooting depth, slope.	Slope, rooting depth, percs slowly.
PsB---------- Poquonock	Moderate: slope.	Moderate: piping.	No water-------	Deep to water	Percs slowly, rooting depth, slope.	Rooting depth, percs slowly.
QnA---------- Quonset	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake.	Droughty.
QnB---------- Quonset	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake.	Droughty.
QnC, QnD---------- Quonset	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake.	Slope, droughty.
Ra---------- Raynham	Slight---------	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action.	Wetness, percs slowly, erodes easily.	Wetness, percs slowly, erodes easily.
RdA---------- Ridgebury	Slight---------	Severe: wetness, piping.	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly, rooting depth.	Wetness, percs slowly, rooting depth.
RdB---------- Ridgebury	Moderate: slope.	Severe: wetness, piping.	Severe: no water.	Slope, percs slowly, frost action.	Slope, wetness, percs slowly.	Wetness, percs slowly, rooting depth.
RsA---------- Ridgebury	Slight---------	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly, rooting depth.	Wetness, percs slowly, rooting depth.
RsB---------- Ridgebury	Moderate: slope.	Severe: piping, wetness.	Severe: no water.	Slope, percs slowly, frost action.	Slope, wetness, percs slowly.	Wetness, percs slowly, rooting depth.
Sa---------- Saco	Moderate: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Flooding, frost action, cutbanks cave.	Wetness, flooding.	Wetness.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
Sc---------- Scarboro	Severe: seepage.	Severe: seepage, ponding.	Severe: cutbanks cave.	Cutbanks cave, frost action.	Ponding, fast intake, droughty.	Wetness, droughty.
SdA---------- Sudbury	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness---------	Favorable.
SdB---------- Sudbury	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Slope, cutbanks cave.	Wetness, slope.	Favorable.
Su---------- Suncook	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, flooding.	Too sandy.
Sw---------- Swansea	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Cutbanks cave, frost action.	Wetness---------	Wetness.
Ud*. Udorthents						
Ur*. Urban land						
Wa---------- Walpole	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness---------	Wetness.
Wg---------- Whitman	Slight---------	Severe: piping, ponding.	Severe: no water.	Percs slowly, frost action.	Ponding, percs slowly, rooting depth.	Wetness, percs slowly, rooting depth.
Wh---------- Whitman	Slight---------	Severe: piping, ponding.	Severe: no water.	Percs slowly, frost action.	Ponding, percs slowly, rooting depth.	Large stones, wetness, percs slowly.
WnA---------- Windsor	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Cutbanks cave	Droughty, fast intake.	Droughty.
WnB---------- Windsor	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Slope, cutbanks cave.	Slope, droughty, fast intake.	Droughty.
WnC, WnD---------- Windsor	Severe: slope, seepage.	Severe: seepage, piping.	Severe: no water.	Slope, cutbanks cave.	Slope, droughty, fast intake.	Slope, droughty.
Wo---------- Winooski	Severe: seepage.	Severe: piping.	Severe: cutbanks cave.	Flooding, frost action, cutbanks cave.	Wetness, erodes easily, flooding.	Erodes easily.
WrA---------- Woodbridge	Slight---------	Severe: piping.	Severe: no water.	Percs slowly, frost action.	Wetness, percs slowly.	Rooting depth, percs slowly.
WrB---------- Woodbridge	Moderate: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Rooting depth, percs slowly.
WrC---------- Woodbridge	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Slope, rooting depth, percs slowly.
WsB---------- Woodbridge	Moderate: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Rooting depth, percs slowly.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
WsC---------- Woodbridge	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Slope, rooting depth, percs slowly.
WtB---------- Woodbridge	Moderate: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Rooting depth, percs slowly.
WtC---------- Woodbridge	Severe: slope.	Severe: piping.	Severe: no water.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Slope, rooting depth, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AgA, AgB, AgC---- Agawam	0-7	Fine sandy loam	SM, ML	A-4	0	95-100	90-100	65-95	40-65	<25	NP-3
	7-25	Fine sandy loam, very fine sandy loam, loam.	SM, ML	A-4	0	95-100	85-100	65-95	40-65	<25	NP-3
	25-29	Fine sand, loamy fine sand, loamy sand.	SM, SP-SM	A-2	0	90-100	85-100	40-90	5-35	---	NP
	29-60	Stratified fine sand to very gravelly loamy sand.	SM, SP-SM, GM, GP-GM	A-1, A-2, A-3	0-5	50-100	30-100	15-80	5-35	---	NP
AmB*: Amostown--------	0-8	Fine sandy loam	SM, ML	A-2, A-4	0	95-100	90-100	55-95	30-70	<20	NP-3
	8-30	Fine sandy loam, sandy loam.	SM, ML	A-2, A-4	0	90-100	85-100	50-95	25-65	<20	NP-3
	30-60	Stratified silt loam to very fine sand.	ML, SM, SC, CL	A-4, A-2	0	100	100	65-100	25-90	<25	NP-10
Belgrade--------	0-10	Silt loam--------	ML	A-4	0	100	95-100	90-100	60-95	<35	NP-8
	10-36	Silt loam, very fine sandy loam, loamy very fine sand.	ML	A-4	0	100	95-100	85-100	50-90	<35	NP-8
	36-60	Silt loam, loamy very fine sand, sand and gravel.	ML, SM, SC	A-1, A-2, A-4	0	75-100	55-100	35-100	15-90	<35	NP-8
CaB, CaC--------- Canton	0-4	Fine sandy loam	SM, ML	A-2, A-4	0-5	85-95	75-90	55-85	30-60	<18	NP-8
	4-26	Fine sandy loam, very fine sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-10	80-95	70-90	50-85	30-60	<12	NP-8
	26-60	Gravelly loamy sand, loamy fine sand, gravelly loamy coarse sand.	SM, SP-SM	A-1, A-2	10-25	65-85	50-80	20-60	10-30	---	NP
CbB, CbC--------- Canton (Very stony)	0-4	Fine sandy loam	SM, ML	A-2, A-4	5-15	80-95	70-90	50-85	30-60	<18	NP-8
	4-26	Fine sandy loam, very fine sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-10	80-95	70-90	50-85	30-60	<12	NP-8
	26-60	Gravelly loamy sand, loamy fine sand, gravelly loamy coarse sand.	SM, SP-SM	A-1, A-2	10-25	65-85	50-80	20-60	10-30	---	NP
CcB, CcC, CcD, CcE---------- Canton (Extremely stony)	0-4	Fine sandy loam	SM, ML	A-2, A-4	10-30	70-95	60-90	40-85	25-60	<15	NP-8
	4-26	Fine sandy loam, very fine sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-10	80-95	70-90	50-85	30-60	<12	NP-8
	26-60	Gravelly loamy sand, loamy fine sand, gravelly loamy coarse sand.	SM, SP-SM	A-1, A-2	10-25	65-85	50-80	20-60	10-30	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
ChC*, ChD*:											
Chatfield	0-3	Extremely stony fine sandy loam.	SM, GM, GM-GC, SM-SC	A-4, A-2, A-1	5-25	55-80	50-75	30-65	15-50	10-20	1-6
	3-30	Loam, gravelly loam, gravelly sandy loam.	SM, ML, GM, CL-ML	A-4, A-2, A-1	0-5	60-95	55-90	35-80	15-65	10-20	1-6
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Hollis	0-4	Extremely stony fine sandy loam.	SM, ML	A-2, A-4	10-25	75-100	65-95	40-85	25-70	<20	NP-3
	4-17	Fine sandy loam, sandy loam, gravelly loam.	SM, ML	A-2, A-4	0-15	75-95	65-95	40-80	20-65	---	NP
	17	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
De	0-8	Sandy loam	SM, ML	A-2, A-4	0	95-100	80-100	50-85	25-55	---	NP
Deerfield	8-24	Loamy sand, sand, coarse sand.	SM, SP-SM	A-1, A-2, A-3	0	95-100	80-100	40-75	5-30	---	NP
	24-60	Sand, fine sand, coarse sand.	SP, SM	A-1, A-2, A-3	0	95-100	65-100	30-75	3-30	---	NP
Fm, Fp	0-60	Sapric material, hemic material.	PT	A-8	---	---	---	---	---	---	---
Freetown											
HaA	0-8	Very fine sandy loam.	ML, CL-ML	A-4	0	100	95-100	85-100	60-90	<30	NP-9
Hadley	8-40	Silt loam, very fine sandy loam, very fine sand.	ML, CL-ML	A-4	0	100	95-100	80-100	50-90	<39	NP-13
	40-60	Loamy fine sand, silt loam, sand.	ML, CL-ML, SM, SP-SM	A-4, A-2	0	100	95-100	50-100	5-90	<30	NP-13
HgA, HgB, HgC, HgD, HgE	0-3	Sandy loam	SM, SP-SM	A-1, A-2, A-4, A-3	0-5	80-95	75-85	30-80	5-50	---	NP
Hinckley	3-21	Gravelly loamy sand, loamy fine sand, very gravelly loamy coarse sand.	SM, GM, GP-GM, SP-SM	A-1, A-2, A-3	0-20	50-95	30-85	15-70	2-30	---	NP
	21-60	Stratified very gravelly loamy fine sand to cobbly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	5-30	20-65	20-50	10-40	0-20	---	NP
HkB, HkC	0-3	Fine sandy loam	SM, SP-SM, GM, GP-GM	A-1, A-2, A-3	5-20	50-90	35-85	25-70	5-35	---	NP
Hinckley (Very stony)	3-21	Gravelly loamy sand, loamy fine sand, very gravelly loamy coarse sand.	SM, SP-SM, GM, GP-GM	A-1, A-2, A-3	0-20	50-90	35-85	15-70	2-35	---	NP
	21-60	Stratified very gravelly loamy fine sand to cobbly coarse sand.	SM, SP-SM, GP, GP-GM	A-1, A-2	0-30	20-65	15-55	10-40	0-20	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
HuC*:											
Hinckley--------	0-3	Sandy loam-------	SM, SP-SM	A-1, A-2, A-4, A-3	0-5	80-95	75-85	30-80	5-50	---	NP
	3-21	Gravelly loamy sand, loamy fine sand, very gravelly loamy coarse sand.	SM, GM, GP-GM, SP-SM	A-1, A-2, A-3	0-20	50-95	30-85	15-70	2-30	---	NP
	21-60	Stratified very gravelly loamy fine sand to cobbly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	5-30	20-65	20-50	10-40	0-20	---	NP
Urban land.											
HwB----------	0-7	Loamy sand-------	SM	A-2	0-5	95-100	85-100	50-80	15-30	---	NP
Hinesburg	7-31	Loamy fine sand, loamy sand, sand.	SP-SM, SM	A-2, A-3	0-5	95-100	85-100	50-80	5-30	---	NP
	31-60	Very fine sandy loam, silt loam, silty clay loam.	ML, CL-ML	A-4	0	95-100	90-100	75-90	55-80	<30	NP-5
Lm----------	0-9	Silt loam--------	ML	A-4	0	100	100	95-100	80-95	---	NP
Limerick	9-29	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	95-100	80-95	---	NP
	29-60	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	95-100	80-95	---	NP
MeA, MeB, MeC, MeD----------	0-15	Fine sandy loam	SM, ML	A-2, A-4	0	85-95	70-90	40-85	20-55	---	NP
Merrimac	15-24	Sandy loam-------	SM	A-2	0	75-95	70-90	40-60	20-35	---	NP
	24-60	Stratified sand to very gravelly coarse sand.	GP, SP, SP-SM, GP-GM	A-1	5-25	40-65	30-60	15-40	0-10	---	NP
NgA----------	0-9	Fine sandy loam	SM, ML	A-4	0	95-100	90-100	70-95	40-65	<25	NP-3
Ninigret	9-21	Fine sandy loam, sandy loam, very fine sandy loam.	SM	A-2, A-4	0	95-100	90-100	65-85	20-50	<25	NP-3
	21-60	Loamy sand, sand, gravelly sand.	SP, SM, GP	A-1, A-2, A-3	0-20	45-100	30-90	25-65	0-30	---	NP
PaB, PaC, PaD----	0-5	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	0-10	80-95	75-90	60-85	30-65	<30	NP-10
Paxton	5-27	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	65-90	50-85	25-65	<30	NP-10
	27-60	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	60-85	50-75	20-60	<30	NP-10
PbB, PbC, PbD----	0-5	Fine sandy loam	SM, ML, SC, CL	A-2, A-4	5-20	80-95	75-90	60-85	30-65	<30	NP-10
Paxton (Very stony)	5-27	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SC, CL	A-2, A-4	5-20	70-90	65-90	50-85	25-65	<30	NP-10
	27-60	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SC, CL	A-2, A-4	5-15	70-90	60-85	50-75	20-60	<30	NP-10

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
PcB, PcC, PcD, PcE---------- Paxton (Extremely stony)	0-5	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	10-25	80-90	70-85	60-80	30-65	<30	NP-10
	5-27	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	5-20	70-90	65-90	50-85	25-65	<30	NP-10
	27-60	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	5-15	70-90	60-85	50-75	20-60	<30	NP-10
PdC*: Paxton----------	0-5	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	0-10	80-95	75-90	60-85	30-65	<30	NP-10
	5-27	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	65-90	50-85	25-65	<30	NP-10
	27-60	Fine sandy loam, loam, gravelly sandy loam.	SM, ML, SM-SC	A-2, A-4	0-15	70-90	60-85	50-75	20-60	<30	NP-10
Urban land.											
Pg*, Pm*. Pits											
PoB, PoC---------- Poquonock	0-7	Loamy sand--------	SM	A-2	0-2	90-100	85-100	65-85	20-30	---	NP
	7-34	Loamy fine sand, loamy sand, sand.	SM	A-2	0-5	90-100	85-100	55-85	20-30	---	NP
	34-60	Gravelly loam, gravelly fine sandy loam, silt loam.	SM, ML	A-2, A-4	0-15	85-90	60-85	50-75	25-70	<30	NP-10
PsB---------- Poquonock (Very stony)	0-7	Loamy sand--------	SM	A-2	5-15	90-100	85-100	50-85	20-30	---	NP
	7-34	Loamy fine sand, loamy sand, sand.	SM	A-2	0-5	90-100	85-100	50-85	10-30	---	NP
	34-60	Gravelly loam, gravelly fine sandy loam, silt loam.	SM, ML	A-2, A-4	0-15	85-90	60-85	50-75	25-70	<30	NP-10
QnA, QnB, QnC, QnD---------- Quonset	0-3	Loamy sand--------	SP-SM, SM, ML	A-2, A-4	0-5	75-100	70-100	50-85	10-55	---	NP
	3-18	Channery loamy sand, gravelly loamy sand, loamy sand.	GP-GM, GM, SP-SM, SM	A-1, A-2	0-5	45-75	40-75	20-50	5-20	---	NP
	18-60	Stratified very channery coarse sand to very channery sand.	GP, GP-GM, SP, SP-SM	A-1, A-2	0-5	20-70	10-60	5-45	0-10	---	NP
Ra---------- Raynham	0-3	Silt loam--------	ML	A-4	0	100	95-100	80-100	55-95	<25	NP-10
	3-24	Silt loam, silt, very fine sandy loam.	ML	A-4	0	100	95-100	80-100	55-95	<25	NP-10
	24-60	Silt loam, silt, very fine sandy loam.	ML	A-4	0	100	95-100	90-100	70-95	<25	NP-10
RdA---------- Ridgebury	0-9	Fine sandy loam	SM, ML	A-1, A-2, A-4	0-5	80-100	75-90	40-90	20-70	---	NP
	9-23	Sandy loam, gravelly loam.	SM, ML	A-1, A-2, A-4	0-15	65-95	55-90	40-80	20-60	---	NP
	23-60	Sandy loam, gravelly loam.	SM, ML	A-1, A-2, A-4	0-15	65-95	55-90	35-80	20-60	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
RdB---------- Ridgebury	0-9	Fine sandy loam	SM, ML	A-1, A-2, A-4	0-5	80-100	75-90	40-90	20-70	---	NP
	9-23	Sandy loam, gravelly loam.	SM, ML	A-1, A-2, A-4	0-15	65-95	55-90	40-80	20-60	---	NP
	23-60	Sandy loam, gravelly loam.	SM, ML	A-1, A-2, A-4	0-15	65-95	55-90	35-80	20-60	---	NP
RsA, RsB---------- Ridgebury (Extremely stony)	0-9	Fine sandy loam	SM, ML	A-2, A-4	10-30	70-100	50-85	30-80	15-65	---	NP
	9-23	Sandy loam, gravelly loam.	SM, ML	A-1, A-2, A-4	0-15	65-95	55-90	40-80	20-60	---	NP
	23-60	Sandy loam, gravelly loam.	SM, ML	A-1, A-2, A-4	0-15	65-95	55-90	35-80	20-60	---	NP
Sa---------- Saco	0-12	Silt loam---- ----	ML, OL	A-4	0	100	100	95-100	70-95	<40	NP-10
	12-37	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	95-100	70-95	<40	NP-10
	37-60	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	90-100	70-95	<25	NP-5
Sc---------- Scarboro	0-7	Sapric material	PT	A-8	---	---	---	---	---	---	---
	7-13	Mucky loamy sand, mucky sand, mucky fine sandy loam.	SM, SP-SM	A-1, A-2, A-3, A-4	0	95-100	85-100	45-85	5-50	---	NP
	13-18	Loamy sand, fine sand, sand.	SM, SP-SM	A-1, A-2, A-3	0	95-100	85-100	45-80	5-35	---	NP
	18-60	Loamy sand, sand, coarse sand.	SM, SP-SM, SP	A-1, A-2, A-3	0	95-100	70-100	30-80	2-35	---	NP
SdA, SdB---------- Sudbury	0-9	Fine sandy loam	SM, ML	A-2, A-4, A-1	0-5	85-100	70-100	40-90	20-55	---	NP
	9-18	Sandy loam, fine sandy loam, gravelly sandy loam.	SM	A-2, A-4, A-1	0-5	85-100	60-100	40-80	20-50	---	NP
	18-60	Gravelly coarse sand, loamy sand, sandy loam.	SM, SP-SM	A-1, A-2, A-3	0-5	70-100	60-100	30-70	5-35	---	NP
Su---------- Suncook	0-9	Loamy fine sand	SM	A-2	0	95-100	85-100	65-70	15-35	---	NP
	9-60	Stratified loamy fine sand to coarse sand.	SP, SM	A-2, A-3	0	90-100	70-100	20-80	0-35	---	NP
Sw---------- Swansea	0-13	Sapric material	PT	A-8	---	---	---	---	---	---	---
	13-36	Sapric material, hemic material.	PT	A-8	---	---	---	---	---	---	---
	36-60	Sand, loamy coarse sand, gravelly loamy coarse sand.	SM, SP-SM	A-1, A-2, A-3	0	55-100	45-100	30-70	5-30	---	NP
Ud*. Udorthents											
Ur*. Urban land											
Va---------- Walpole	2-6	Fine sandy loam	SM	A-2, A-4	0-5	90-100	85-100	70-100	30-50	<25	NP-3
	6-22	Fine sandy loam, sandy loam, gravelly sandy loam.	SM	A-2, A-4	0-5	85-100	60-100	40-95	25-50	---	NP
	22-60	Gravelly loamy sand, gravelly sand, sand.	SP, SM, GP, GP-GM	A-1, A-2, A-3	0-20	55-100	50-100	25-90	0-25	---	NP

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Wg---------- Whitman	0-10	Loam----------	ML, SM, CL-ML	A-2, A-4	0-5	80-100	75-95	45-90	25-85	16-35	NP-10
	10-18	Sandy loam, gravelly fine sandy loam, gravelly silt loam.	ML, SM, CL-ML	A-1, A-2, A-4	0-10	65-95	60-90	35-85	20-60	16-35	NP-10
	18-60	Sandy loam, gravelly fine sandy loam, loam.	ML, SM, CL-ML	A-1, A-2, A-4	0-10	65-95	60-90	35-85	20-60	16-32	NP-8
Wh---------- Whitman (Extremely stony)	0-11	Loam----------	ML, SM, CL-ML	A-1, A-2, A-4	10-40	65-80	60-75	35-70	20-65	16-35	NP-10
	11-19	Sandy loam, gravelly fine sandy loam, gravelly silt loam.	ML, SM, CL-ML	A-1, A-2, A-4	0-10	65-95	60-90	35-85	20-60	16-35	NP-10
	19-60	Sandy loam, gravelly fine sandy loam, loam.	ML, SM, CL-ML	A-1, A-2, A-4	0-10	65-95	60-90	35-85	20-60	16-32	NP-8
WnA, WnB, WnC, WnD---------- Windsor	0-10	Loamy fine sand	SM	A-2, A-1	0	95-100	85-100	35-85	20-35	---	NP
	10-16	Loamy sand, loamy fine sand, sand.	SW-SM, SM, SP-SM	A-2, A-1	0	95-100	85-100	45-95	10-30	---	NP
	16-60	Sand, fine sand	SP-SM, SM	A-2, A-3, A-1	0	90-100	75-100	40-95	5-20	---	NP
Wo---------- Winooski	0-8	Very fine sandy loam.	ML, SM	A-4	0	100	95-100	90-100	40-90	---	NP
	8-60	Silt loam, very fine sandy loam, loamy very fine sand.	ML, SM	A-4	0	100	95-100	90-100	40-90	---	NP
WrA, WrB, WrC---- Woodbridge	0-9	Fine sandy loam	SM, ML, SC, CL	A-2, A-4	0-10	85-95	70-90	60-85	30-65	<30	NP-10
	9-22	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, SC, CL	A-2, A-4	0-15	75-90	65-90	50-85	25-65	<30	NP-10
	22-60	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, SC, CL	A-2, A-4	5-15	70-90	60-85	50-75	20-60	<30	NP-10
WsB, WsC---------- Woodbridge (Very stony)	0-9	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	5-20	85-95	70-90	60-85	30-65	<30	NP-10
	9-22	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, SM-SC	A-2, A-4	5-15	75-95	65-90	50-85	25-60	<30	NP-10
	22-60	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, SM-SC	A-2, A-4	5-15	70-90	60-90	50-75	25-60	<30	NP-10
WtB, WtC---------- Woodbridge (Extremely stony)	0-9	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	10-25	85-95	70-90	60-85	30-65	<30	NP-10
	9-22	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, SM-SC	A-2, A-4	5-15	75-95	65-90	50-85	25-60	<30	NP-10
	22-60	Fine sandy loam, loam, gravelly fine sandy loam.	SM, ML, SM-SC	A-2, A-4	5-15	70-90	60-90	50-75	25-60	<30	NP-10

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
AgA, AgB, AgC----	0-5	4-10	1.10-1.20	2.0-6.0	0.13-0.25	4.5-6.5	Low----------	0.28	3	1-5
Agawam	5-25	1-10	1.20-1.40	2.0-6.0	0.11-0.21	4.5-6.5	Low----------	0.37		
	25-29	1-2	1.30-1.40	6.0-20	0.01-0.09	4.5-6.5	Low----------	0.17		
	29-60	<1	1.30-1.50	6.0-20	0.01-0.09	4.5-6.5	Low----------	0.10		
AmB*:										
Amostown--------	0-8	4-10	1.00-1.20	2.0-6.0	0.11-0.18	5.1-7.3	Low----------	0.28	3	2-5
	8-30	1-5	1.20-1.40	2.0-6.0	0.10-0.15	5.1-6.0	Low----------	0.28		
	30-60	1-3	1.30-1.50	<0.2	0.15-0.21	5.1-7.3	Low----------	0.64		
Belgrade--------	0-10	4-15	0.95-1.15	0.6-2.0	0.18-0.25	4.5-7.3	Low----------	0.49	3	1-5
	10-36	4-15	1.10-1.40	0.6-2.0	0.16-0.20	4.5-7.3	Low----------	0.64		
	36-60	2-20	1.20-1.40	0.06-6.0	0.06-0.20	5.1-7.3	Low----------	0.64		
CaB, CaC---------	0-4	1-8	0.90-1.20	2.0-6.0	0.11-0.19	3.6-6.0	Low----------	0.24	3	1-6
Canton	4-26	1-8	1.20-1.50	2.0-6.0	0.09-0.17	3.6-6.0	Low----------	0.28		
	26-60	1-5	1.30-1.50	6.0-20	0.04-0.08	3.6-6.0	Low----------	0.17		
CbB, CbC---------	0-4	1-8	0.90-1.20	2.0-6.0	0.13-0.20	3.6-6.0	Low----------	0.20	3	---
Canton	4-26	1-8	1.20-1.50	2.0-6.0	0.09-0.17	3.6-6.0	Low----------	0.28		
	26-60	1-5	1.30-1.60	6.0-20	0.04-0.08	3.6-6.0	Low----------	0.17		
CcB, CcC, CcD,										
CcE---------	0-4	1-8	0.90-1.20	2.0-6.0	0.13-0.17	3.6-6.0	Low----------	0.20	3	---
Canton	4-26	1-8	1.20-1.50	2.0-6.0	0.09-0.17	3.6-6.0	Low----------	0.28		
	26-60	1-5	1.30-1.60	6.0-20	0.04-0.08	3.6-6.0	Low----------	0.17		
ChC*, ChD*:										
Chatfield-------	0-3	7-18	1.10-1.40	0.6-6.0	0.08-0.14	4.5-6.0	Low----------	0.20	3	---
	3-30	7-18	1.20-1.50	0.6-6.0	0.08-0.15	4.5-6.0	Low----------	0.20		
	30	---	---	---	---	---	----------	----		
Hollis----------	0-4	3-10	1.10-1.40	0.6-6.0	0.10-0.21	4.5-6.0	Low----------	0.17	1	---
	4-17	1-8	1.30-1.55	0.6-6.0	0.06-0.18	4.5-6.0	Low----------	0.32		
	17	---	---	---	---	---	----------	----		
Rock outcrop.										
De----------	0-8	2-7	0.95-1.10	2.0-6.0	0.12-0.23	4.5-6.5	Low----------	0.24	5	1-4
Deerfield	8-24	1-7	1.20-1.45	6.0-20	0.01-0.13	4.5-6.5	Low----------	0.17		
	24-60	0-5	1.40-1.50	>6.0	0.01-0.08	4.5-6.5	Low----------	0.17		
Pm, Pp----------	0-60	---	0.10-0.30	0.6-6.0	0.35-0.45	3.6-4.4	Low----------	----	---	>50
Freetown										
HaA----------	0-8	4-10	1.20-1.50	0.6-2.0	0.15-0.25	4.5-7.3	Low----------	0.49	5	2-5
Hadley	8-40	2-10	1.20-1.50	0.6-6.0	0.13-0.20	4.5-7.8	Low----------	0.49		
	40-60	1-8	1.20-1.50	0.6-6.0	0.10-0.20	5.1-7.8	Low----------	0.49		
HgA, HgB, HgC,										
HgD, HgE--------	0-3	4-8	0.90-1.10	6.0-20	0.05-0.20	3.6-6.0	Low----------	0.20	3	2-7
Hinckley	3-21	1-5	1.20-1.40	6.0-20	0.01-0.10	3.6-6.0	Low----------	0.17		
	21-60	0-3	1.30-1.50	>20	0.01-0.06	3.6-6.0	Low----------	0.10		
HkB, HkC---------	0-3	4-8	0.90-1.10	6.0-20	0.03-0.14	3.6-6.0	Low----------	0.17	3	---
Hinckley	3-21	1-5	1.20-1.40	6.0-20	0.01-0.10	3.6-6.0	Low----------	0.17		
	21-60	0-3	1.30-1.50	>20	0.01-0.06	3.6-6.0	Low----------	0.10		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm³	In/hr	In/in	pH				Pct
HuC*:										
Hinckley--------	0-3	4-8	0.90-1.10	6.0-20	0.05-0.20	3.6-6.0	Low----------	0.20	3	2-7
	3-21	1-5	1.20-1.40	6.0-20	0.01-0.10	3.6-6.0	Low----------	0.17		
	21-60	0-3	1.30-1.50	>20	0.01-0.06	3.6-6.0	Low----------	0.10		
Urban land.										
HwB---------------	0-7	1-5	1.20-1.50	6.0-20	0.08-0.12	5.6-6.5	Low----------	0.24	3	3-6
Hinesburg	7-31	1-5	1.30-1.50	6.0-20	0.04-0.10	5.6-6.5	Low----------	0.24		
	31-60	3-16	1.30-1.70	0.2-0.6	0.18-0.22	5.1-7.3	Low----------	0.43		
Lm----------------	0-9	4-10	1.10-1.50	0.6-2.0	0.18-0.30	5.1-7.3	Low----------	0.49	3	2-5
Limerick	9-29	2-10	1.10-1.50	0.6-2.0	0.18-0.26	5.6-7.3	Low----------	0.49		
	29-60	1-8	1.20-1.50	0.6-2.0	0.18-0.25	5.6-7.3	Low----------	0.49		
MeA, MeB, MeC, MeD----------	0-15	3-7	1.10-1.20	2.0-6.0	0.14-0.19	3.6-6.0	Low----------	0.24	3	1-5
Merrimac	15-24	1-4	1.20-1.40	2.0-6.0	0.14-0.17	3.6-6.0	Low----------	0.24		
	24-60	0-3	1.30-1.50	6.0-20	0.01-0.06	3.6-6.0	Low----------	0.10		
NgA---------------	0-9	3-7	1.00-1.25	2.0-6.0	0.13-0.25	4.5-6.0	Low----------	0.28	3	2-8
Ninigret	9-21	3-7	1.35-1.60	2.0-6.0	0.06-0.18	4.5-6.0	Low----------	0.32		
	21-60	0-2	1.45-1.70	6.0-20	0.01-0.13	4.5-6.0	Low----------	0.10		
PaB, PaC, PaD-----	0-5	3-12	1.00-1.25	0.6-2.0	0.08-0.23	4.5-6.0	Low----------	0.24	3	2-5
Paxton	5-27	3-12	1.35-1.60	0.6-2.0	0.06-0.20	4.5-6.0	Low----------	0.32		
	27-60	3-12	1.70-2.00	<0.2	0.05-0.12	4.5-6.0	Low----------	0.24		
PbB, PbC, PbD-----	0-5	3-12	1.00-1.25	0.6-6.0	0.08-0.23	4.5-6.0	Low----------	0.20	3	---
Paxton	5-27	3-12	1.35-1.60	0.6-6.0	0.06-0.20	4.5-6.0	Low----------	0.32		
	27-60	3-12	1.70-2.00	<0.2	0.05-0.12	4.5-6.0	Low----------	0.24		
PcB, PcC, PcD, PcE----------	0-5	3-12	1.00-1.25	0.6-6.0	0.05-0.15	4.5-6.0	Low----------	0.20	3	---
Paxton	5-27	3-12	1.35-1.60	0.6-6.0	0.06-0.20	4.5-6.0	Low----------	0.32		
	27-60	3-12	1.70-2.00	<0.2	0.05-0.12	4.5-6.0	Low----------	0.24		
PdC*:										
Paxton----------	0-5	3-12	1.00-1.25	0.6-2.0	0.08-0.23	4.5-6.0	Low----------	0.24	3	2-5
	5-27	3-12	1.35-1.60	0.6-2.0	0.06-0.20	4.5-6.0	Low----------	0.32		
	27-60	3-12	1.70-2.00	<0.2	0.05-0.12	4.5-6.0	Low----------	0.24		
Urban land.										
Pg*, Pm*. Pits										
PoB, PoC----------	0-7	1-5	1.00-1.25	6.0-20	0.07-0.18	4.5-6.0	Low----------	0.20	3	2-5
Poquonock	7-34	1-5	1.35-1.60	>6.0	0.06-0.14	4.5-6.0	Low----------	0.17		
	34-60	2-12	1.70-2.00	<0.2	0.08-0.12	4.5-6.0	Low----------	0.24		
PsB---------------	0-7	1-5	1.00-1.25	6.0-20	0.07-0.18	4.5-6.0	Low----------	0.17	3	---
Poquonock	7-34	1-5	1.35-1.60	>6.0	0.06-0.14	4.5-6.0	Low----------	0.17		
	34-60	2-12	1.70-2.00	<0.2	0.08-0.12	4.5-6.0	Low----------	0.24		
QnA, QnB, QnC, QnD----------	0-3	2-7	1.20-1.30	2.0-20	0.08-0.18	3.6-5.5	Low----------	0.20	3	.6-7
Quonset	3-18	1-4	1.40-1.50	2.0-20	0.04-0.07	3.6-5.5	Low----------	0.17		
	18-60	0-2	1.40-1.50	>20	0.01-0.03	5.1-6.5	Low----------	0.10		
Ra----------------	0-3	3-16	1.20-1.50	0.6-2.0	0.20-0.30	5.1-6.5	Low----------	0.49	5	3-10
Raynham	3-24	3-16	1.20-1.50	0.2-2.0	0.18-0.26	5.1-6.5	Low----------	0.64		
	24-60	3-16	1.20-1.50	0.06-0.2	0.18-0.22	5.6-7.3	Low----------	0.64		
RdA---------------	0-9	3-10	1.00-1.30	0.6-6.0	0.06-0.24	4.5-6.0	Low----------	0.24	3	4-7
Ridgebury	9-23	2-8	1.60-1.90	0.6-6.0	0.04-0.20	4.5-6.0	Low----------	0.32		
	23-60	2-8	1.80-2.00	<0.2	0.01-0.05	4.5-6.0	Low----------	0.24		

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cm³	In/hr	In/in	pH				Pct
RdB----------	0-9	3-10	1.00-1.30	0.6-6.0	0.06-0.24	4.5-6.0	Low----------	0.24	3	4-7
Ridgebury	9-23	2-8	1.60-1.90	0.6-6.0	0.04-0.20	4.5-6.0	Low----------	0.32		
	23-60	2-8	1.80-2.00	<0.2	0.01-0.05	4.5-6.0	Low----------	0.24		
RsA, RsB----------	0-9	3-10	1.00-1.30	0.6-6.0	0.06-0.21	4.5-6.0	Low----------	0.20	3	1 ---
Ridgebury	9-23	2-8	1.60-1.90	0.6-6.0	0.04-0.20	4.5-6.0	Low----------	0.32		
	23-60	2-8	1.80-2.00	<0.2	0.01-0.05	4.5-6.0	Low----------	0.24		
Sa----------	0-12	4-10	1.00-1.40	0.6-2.0	0.17-0.30	5.1-6.5	Low----------	0.49	5	3-20
Saco	12-37	2-10	1.20-1.50	0.6-2.0	0.15-0.26	5.1-6.5	Low----------	0.64		
	37-60	2-10	1.20-1.50	>6.0	0.10-0.26	5.6-7.3	Low----------	0.64		
Sc----------	0-7	---	0.55-0.75	6.0-20	0.20-0.45	4.5-6.0	Low----------	----	5	---
Scarboro	7-13	1-7	0.70-1.00	>6.0	0.10-0.23	4.5-6.0	Low----------	0.17		
	13-18	1-5	1.15-1.35	>6.0	0.04-0.13	4.5-6.0	Low----------	0.17		
	18-60	0-2	1.35-1.55	>6.0	0.02-0.13	4.5-6.0	Low----------	0.10		
SdA, SdB----------	0-9	2-6	1.10-1.40	2.0-6.0	0.10-0.25	3.6-6.0	Low----------	0.24	3	2-6
Sudbury	9-18	2-7	1.15-1.45	2.0-6.0	0.07-0.18	3.6-6.0	Low----------	0.24		
	18-60	0-4	1.25-1.45	2.0-20	0.01-0.15	3.6-6.0	Low----------	0.17		
Su----------	0-9	1-3	1.10-1.30	>6.0	0.07-0.15	4.5-6.5	Low----------	0.17	5	2-5
Suncook	9-60	0-3	1.20-1.50	>6.0	0.01-0.13	4.5-6.5	Low----------	0.17		
Sw----------	0-13	---	0.10-0.30	0.6-6.0	0.35-0.45	3.6-4.4	Low----------	----	---	>50
Swansea	13-36	---	0.15-0.30	0.6-6.0	0.35-0.45	3.6-4.4	Low----------	----		
	36-60	1-5	1.15-1.40	>20	0.01-0.08	3.6-4.4	Low----------	0.10		
Ud*. Udorthents										
Ur*. Urban land										
Wa----------	2-6	2-6	1.00-1.25	2.0-6.0	0.10-0.23	4.5-6.0	Low----------	0.20	3	2-8
Walpole	6-22	2-6	1.30-1.55	2.0-6.0	0.07-0.18	4.5-6.0	Low----------	0.24		
	22-60	0-2	1.40-1.65	>6.0	0.01-0.13	4.5-6.0	Low----------	0.10		
Wg----------	0-10	5-8	1.10-1.30	0.6-6.0	0.13-0.23	4.5-6.5	Low----------	0.28	3	2-8
Whitman	10-18	2-4	1.60-1.80	0.6-6.0	0.10-0.17	4.5-6.5	Low----------	0.32		
	18-60	1-3	1.80-2.00	<0.2	0.03-0.04	4.5-6.5	Low----------	0.24		
Wh----------	0-11	5-8	1.10-1.30	0.6-6.0	0.12-0.26	4.5-6.5	Low----------	0.20	3	---
Whitman	11-19	2-4	1.60-1.85	0.6-6.0	0.10-0.17	4.5-6.5	Low----------	0.32		
	19-60	1-3	1.85-2.00	<0.2	0.03-0.04	4.5-6.5	Low----------	0.24		
WnA, WnB, WnC, WnD----------	0-10	1-3	1.00-1.20	>6.0	0.08-0.12	4.5-6.0	Low----------	0.17	5	2-4
Windsor	10-16	0-3	1.30-1.55	>6.0	0.02-0.12	4.5-6.0	Low----------	0.17		
	16-60	0-2	1.40-1.65	>6.0	0.01-0.08	4.5-6.0	Low----------	0.10		
Wo----------	0-8	5-18	1.15-1.35	0.6-6.0	0.15-0.23	4.5-7.3	Low----------	0.49	5	2-5
Winooski	8-60	2-10	1.20-1.50	0.6-6.0	0.13-0.21	5.6-7.3	Low----------	0.49		
WrA, WrB, WrC----	0-9	3-12	1.00-1.25	0.6-2.0	0.08-0.23	4.5-6.0	Low----------	0.24	3	2-6
Woodbridge	9-22	3-12	1.35-1.60	0.6-2.0	0.06-0.20	4.5-6.0	Low----------	0.32		
	22-60	3-12	1.70-2.00	<0.2	0.05-0.12	4.5-6.0	Low----------	0.24		
WsB, WsC----------	0-9	3-12	1.00-1.25	0.6-2.0	0.08-0.23	4.5-6.0	Low----------	0.20	3	---
Woodbridge	9-22	3-12	1.35-1.60	0.6-2.0	0.06-0.20	4.5-6.0	Low----------	0.32		
	22-60	3-12	1.70-2.00	<0.2	0.05-0.12	4.5-6.0	Low----------	0.24		
WtB, WtC----------	0-9	3-12	1.00-1.25	0.6-2.0	0.08-0.23	4.5-6.0	Low----------	0.20	3	---
Woodbridge	9-22	3-12	1.35-1.60	0.6-2.0	0.06-0.20	4.5-6.0	Low----------	0.32		
	22-60	3-12	1.70-2.00	<0.2	0.05-0.12	4.5-6.0	Low----------	0.24		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
AgA, AgB, AgC----- Agawam	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Low------	High.
AmB*:												
Amostown---------	C	None--------	---	---	1.5-3.0	Apparent	Dec-Apr	>60	---	Moderate	Moderate	Moderate.
Belgrade---------	B	None--------	---	---	1.5-3.5	Apparent	Nov-Apr	>60	---	High-----	Moderate	Moderate.
CaB, CaC, CbB, CbC, CcB, CcC, CcD, CcE--------- Canton	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Low------	High.
ChC*, ChD*:												
Chatfield--------	B	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	Low------	Moderate.
Hollis-----------	C/D	None--------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low------	High.
Rock outcrop.												
De---------- Deerfield	B	None--------	---	---	1.5-3.0	Apparent	Dec-Apr	>60	---	Moderate	Low------	High.
Fm---------- Freetown	D	None--------	---	---	0-1.0	Apparent	Jan-Dec	>60	---	High-----	High-----	High.
Pp**---------- Freetown	D	None--------	---	---	+3-0	Apparent	Jan-Dec	>60	---	High-----	High-----	High.
HaA---------- Hadley	B	Occasional	Brief-----	Feb-Apr	4.0-6.0	Apparent	Nov-Apr	>60	---	High-----	Low------	Moderate.
HgA, HgB, HgC, HgD, HgE, HkB, HkC---------- Hinckley	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Low------	High.
HuC*:												
Hinckley---------	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Low------	High.
Urban land.												
HwB---------- Hinesburg	C	None--------	---	---	1.5-2.5	Perched	Nov-May	>60	---	Moderate	Low------	Moderate.
Lm---------- Limerick	C	Frequent----	Brief-----	Jan-Jun	0.5-1.5	Apparent	Nov-Jun	>60	---	High-----	High-----	Low.

See footnote at end of table.

TABLE 7.--SOILS AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
MeA, MeB, MeC, MeD--Merrimac	A	None	---	---	>6.0	---	---	>60	---	Low	Low	High.
NgA--Ninigret	B	None	---	---	1.5-3.0	Apparent	Nov-Apr	>60	---	Moderate	Low	High.
PaB, PaC, PaD, PbB, PbC, PbD, PcB, PcC, PcD, PcE--Paxton	C	None	---	---	1.5-2.5	Perched	Feb-Apr	>60	---	Moderate	Low	Moderate.
PdC*: Paxton	C	None	---	---	1.5-2.5	Perched	Feb-Apr	>60	---	Moderate	Low	Moderate.
Urban land.												
Pg*, Pm*. Pits												
PoB, PoC, PsB--Poquonock	C	None	---	---	1.5-2.5	Perched	Feb-Mar	>60	---	Low	Low	High.
QnA, QnB, QnC, QnD--Quonset	A	None	---	---	>6.0	---	---	>60	---	Low	Low	High.
Ra--Raynham	C	None	---	---	0.5-2.0	Apparent	Nov-May	>60	---	High	High	Moderate.
RdA, RdB, RsA, RsB--Ridgebury	C	None	---	---	0-1.5	Perched	Nov-May	>60	---	High	High	High.
Sa--Saco	D	Frequent	Brief	Nov-May	0-0.5	Apparent	Sep-Jun	>60	---	High	Low	Moderate.
Sc**--Scarboro	D	None	---	---	+1-1.0	Apparent	Jan-Dec	>60	---	High	High	High.
SdA, SdB--Sudbury	B	None	---	---	1.5-3.0	Apparent	Dec-Apr	>60	---	Moderate	Low	High.
Su--Suncook	A	Occasional	Brief	Mar-May	3.0-6.0	Apparent	Jan-Apr	>60	---	Low	Low	High.
Sw--Swansea	D	None	---	---	0-1.0	Apparent	Jan-Dec	>60	---	High	High	High.
Ud*. Udorthents												

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Ur*. Urban land												
Wa---------- Walpole	C	None--------	---	---	0-1.0	Apparent	Nov-Apr	>60	---	High-----	Low------	High.
Wg, Wh**---------- Whitman	D	None--------	---	---	+1-0.5	Perched	Sep-Jun	>60	---	High-----	High-----	High.
WnA, WnB, WnC, WnD---------- Windsor	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Low------	High.
Wo---------- Winooski	B	Occasional	Brief-----	Feb-Apr	1.5-3.0	Apparent	Nov-Apr	>60	---	High-----	Moderate	Moderate.
WrA, WrB, WrC----- Woodbridge	C	None--------	---	---	1.5-2.5	Perched	Nov-May	>60	---	High-----	Low------	Moderate.
WsB, WsC, WtB, WtC---------- Woodbridge	C	None--------	---	---	1.5-3.0	Perched	Nov-May	>60	---	High-----	Low------	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

** In the "High water table--Depth" column, a plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Agawam	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Typic Dystrochrepts
*Amostown	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Belgrade	Coarse-silty, mixed, mesic Aquic Dystric Eutrochrepts
Canton	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Typic Dystrochrepts
Chatfield	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Deerfield	Mixed, mesic Aquic Udipsamments
Freetown	Dysic, mesic Typic Medisaprists
Hadley	Coarse-silty, mixed, nonacid, mesic Typic Udifluvents
Hinckley	Sandy-skeletal, mixed, mesic Typic Udorthents
Hinesburg	Sandy over loamy, mixed, nonacid, mesic Typic Udorthents
Hollis	Loamy, mixed, mesic Lithic Dystrochrepts
Limerick	Coarse-silty, mixed, nonacid, mesic Typic Fluvaquents
Merrimac	Sandy, mixed, mesic Typic Dystrochrepts
Ninigret	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Aquic Dystrochrepts
Paxton	Coarse-loamy, mixed, mesic Typic Dystrochrepts
Poquonock	Sandy over loamy, mixed, nonacid, mesic Typic Udorthents
Quonset	Sandy-skeletal, mixed, mesic Typic Udorthents
Raynham	Coarse-silty, mixed, nonacid, mesic Aeric Haplaquepts
Ridgebury	Coarse-loamy, mixed, nonacid, mesic Aeric Haplaquepts
Saco	Coarse-silty, mixed, nonacid, mesic Fluvaquentic Humaquepts
Scarboro	Sandy, mixed, mesic Histic Humaquepts
Sudbury	Sandy, mixed, mesic Aquic Dystrochrepts
Suncook	Mixed, mesic Typic Udipsamments
Swansea	Sandy or sandy-skeletal, mixed, dysic, mesic Terric Medisaprists
Udorthents	Udorthents
Walpole	Sandy, mixed, mesic Aeric Haplaquepts
Whitman	Coarse-loamy, mixed, nonacid, mesic Typic Humaquepts
Windsor	Mixed, mesic Typic Udipsamments
Winooski	Coarse-silty, mixed, nonacid, mesic Aquic Udifluvents
Woodbridge	Coarse-loamy, mixed, mesic Aquic Dystrochrepts

* The soils are a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

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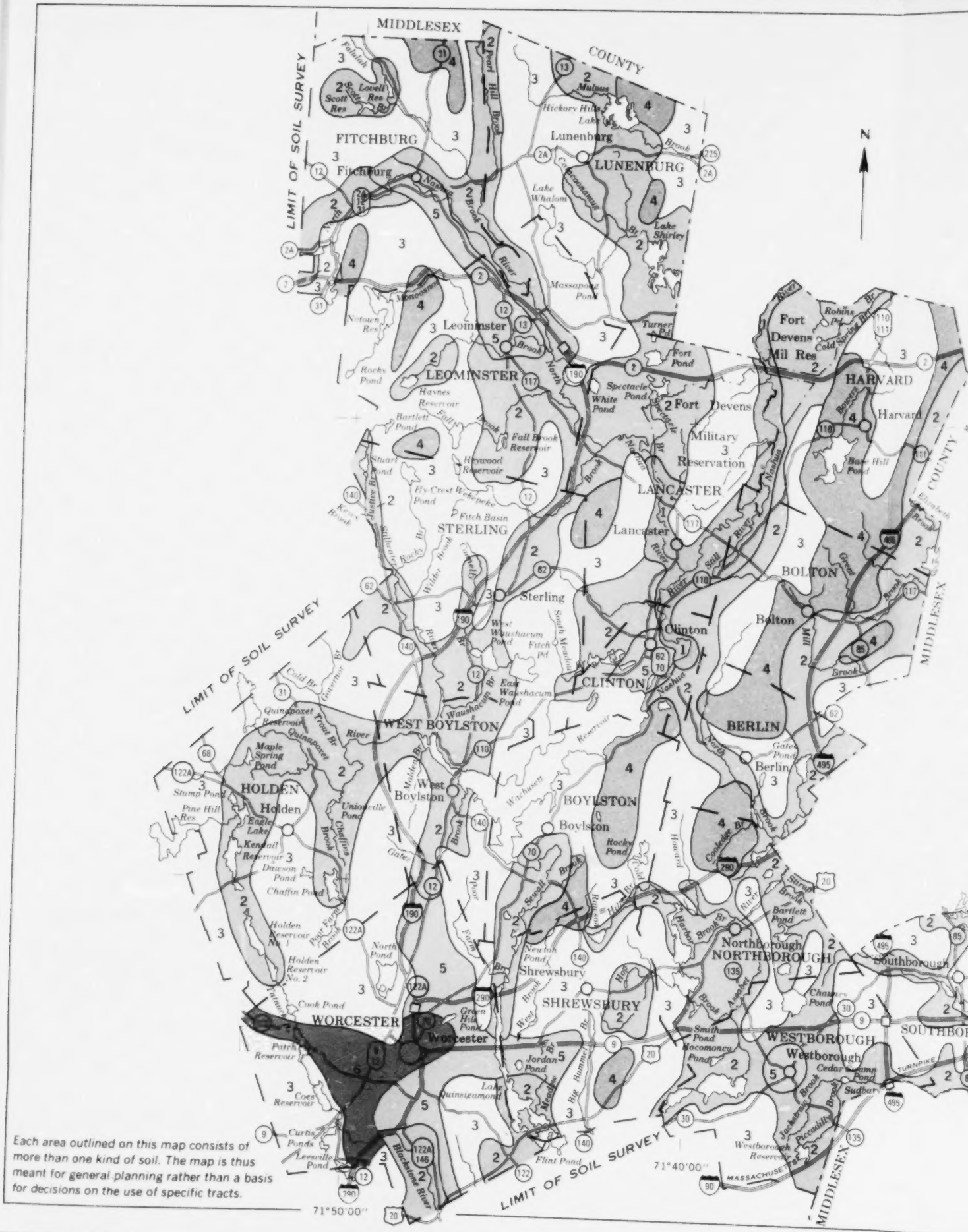


Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

LEGEND

1 — **Winooski-Limerick-Saco**: Very deep, nearly level soils that are moderately well drained, poorly drained, and very poorly drained; on flood plains

2 — **Hinckley-Merrimac-Windsor**: Very deep, nearly level to steep soils that are excessively drained and somewhat excessively drained; on outwash plains

3 — **Paxton-Woodbridge-Canton**: Very deep, nearly level to steep soils that are well drained and moderately well drained; on uplands

4 — **Chatfield-Hollis**: Moderately deep and shallow, gently sloping to moderately steep soils that are well drained or somewhat excessively drained; on uplands

5 — **Urban land-Hinckley**: Urban areas and very deep, nearly level to moderately steep soils that are excessively drained; on outwash plains

6 — **Paxton-Urban land**: Urban areas and very deep, nearly level to moderately steep soils that are well drained; on uplands

Compiled 1984

42°30'00"

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
MASSACHUSETTS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

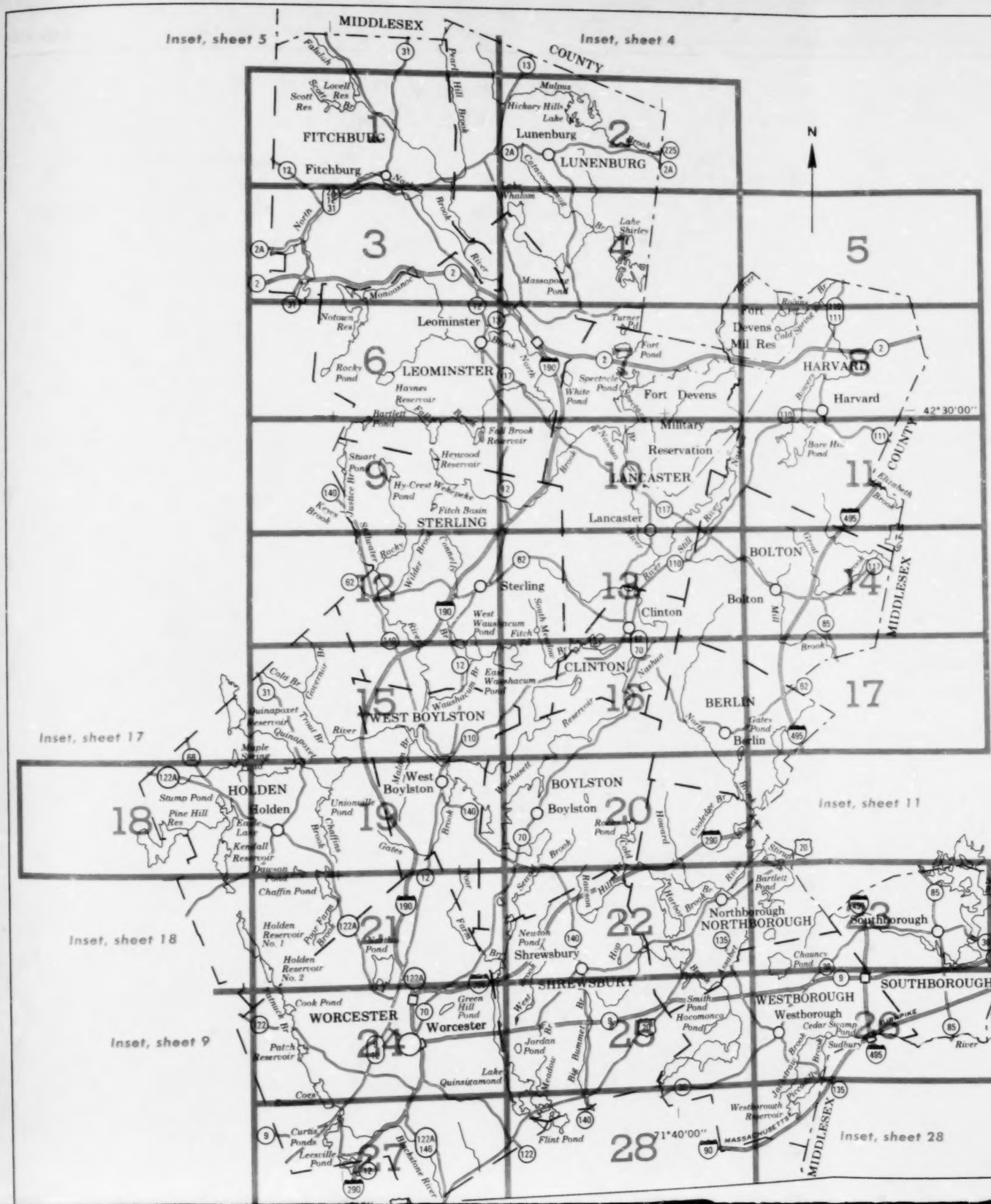
WORCESTER COUNTY, MASSACHUSETTS

NORTHEASTERN PART

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km



INDEX TO MAP SHEETS

WORCESTER COUNTY, MASSACHUSETTS

NORTHEASTERN PART

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km

SOIL LEGEND

Publication symbols consist of letters. The first letter, always a capital, is the initial letter of the soil name. The second letter is lower case and separates map units, except those that are slope phases, having names that begin with the same letter. The third letter, always a capital A, B, C, D, or E, indicates the class of slope. Symbols without a slope letter are for nearly level soils, soils named for higher categories, or for miscellaneous areas.

SYMBOL	NAME
AgA	Agawam fine sandy loam, 0 to 3 percent slopes
AgB	Agawam fine sandy loam, 3 to 8 percent slopes
AgC	Agawam fine sandy loam, 8 to 15 percent slopes
AmB	Amostown and Belgrade soils, 3 to 8 percent slopes
CaB	Canton fine sandy loam, 3 to 8 percent slopes
CaC	Canton fine sandy loam, 8 to 15 percent slopes
CbB	Canton fine sandy loam, 3 to 8 percent slopes, very stony
CbC	Canton fine sandy loam, 8 to 15 percent slopes, very stony
CcB	Canton fine sandy loam, 3 to 8 percent slopes, extremely stony
CcC	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony
CcD	Canton fine sandy loam, 15 to 25 percent slopes, extremely stony
CcE	Canton fine sandy loam, 25 to 35 percent slopes, extremely stony
ChC	Chatfield-Hollis-Rock outcrop complex, 3 to 15 percent slopes
ChD	Chatfield-Hollis-Rock outcrop complex, 15 to 25 percent slopes
De	Deerfield sandy loam
Fm	Freetown muck
Fp	Freetown muck, ponded
HaA	Hadley very fine sandy loam
HgA	Hinckley sandy loam, 0 to 3 percent slopes
HgB	Hinckley sandy loam, 3 to 8 percent slopes
HgC	Hinckley sandy loam, 8 to 15 percent slopes
HgD	Hinckley sandy loam, 15 to 25 percent slopes
HgE	Hinckley sandy loam, 25 to 35 percent slopes
HkB	Hinckley sandy loam, 3 to 8 percent slopes, very stony
HkC	Hinckley sandy loam, 8 to 15 percent slopes, very stony
HuC	Hinckley-Urban land complex, 0 to 15 percent slopes
HwB	Hinesburg loamy sand, 3 to 8 percent slopes
Lm	Limerick silt loam
MeA	Merrimac fine sandy loam, 0 to 3 percent slopes
MeB	Merrimac fine sandy loam, 3 to 8 percent slopes
MeC	Merrimac fine sandy loam, 8 to 15 percent slopes
MeD	Merrimac fine sandy loam, 15 to 25 percent slopes
NgA	Ninigret fine sandy loam, 0 to 3 percent slopes
PaB	Paxton fine sandy loam, 3 to 8 percent slopes
PaC	Paxton fine sandy loam, 8 to 15 percent slopes
PaD	Paxton fine sandy loam, 15 to 25 percent slopes
PbB	Paxton fine sandy loam, 3 to 8 percent slopes, very stony
PbC	Paxton fine sandy loam, 8 to 15 percent slopes, very stony
PbD	Paxton fine sandy loam, 15 to 25 percent slopes, very stony
PcB	Paxton fine sandy loam, 3 to 8 percent slopes, extremely stony
PcC	Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony
PcD	Paxton fine sandy loam, 15 to 25 percent slopes, extremely stony
PcE	Paxton fine sandy loam, 25 to 35 percent slopes, extremely stony
PdC	Paxton-Urban land complex, 8 to 15 percent slopes
Pg	Pits, gravel
Pm	Pits, quarry
PoB	Poquonock loamy sand, 3 to 8 percent slopes
PoC	Poquonock loamy sand, 8 to 15 percent slopes
PsB	Poquonock loamy sand, 3 to 8 percent slopes, very stony
QnA	Quonset loamy sand, 0 to 3 percent slopes
QnB	Quonset loamy sand, 3 to 8 percent slopes
QnC	Quonset loamy sand, 8 to 15 percent slopes
QnD	Quonset loamy sand, 15 to 25 percent slopes
Ra	Raynham silt loam
RdA	Ridgebury fine sandy loam, 0 to 3 percent slopes
RdB	Ridgebury fine sandy loam, 3 to 8 percent slopes
RsA	Ridgebury fine sandy loam, 0 to 3 percent slopes, extremely stony
RsB	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony
Sa	Saco silt loam
Sc	Scarboro mucky fine sandy loam
SdA	Sudbury fine sandy loam, 0 to 3 percent slopes
SdB	Sudbury fine sandy loam, 3 to 8 percent slopes
Su	Suncook loamy fine sand
Sw	Swansea muck
Ud	Udorthents, smoothed
Ur	Urban land
Wa	Walpole fine sandy loam
Wg	Whitman loam
Wh	Whitman loam, extremely stony
WnA	Windsor loamy fine sand, 0 to 3 percent slopes
WnB	Windsor loamy fine sand, 3 to 8 percent slopes
WnC	Windsor loamy fine sand, 8 to 15 percent slopes
WnD	Windsor loamy fine sand, 15 to 25 percent slopes
Wo	Winooski very fine sandy loam
WrA	Woodbridge fine sandy loam, 0 to 3 percent slopes
WrB	Woodbridge fine sandy loam, 3 to 8 percent slopes
WrC	Woodbridge fine sandy loam, 8 to 15 percent slopes
WsB	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony
WsC	Woodbridge fine sandy loam, 8 to 15 percent slopes, very stony
WtB	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony
WtC	Woodbridge fine sandy loam, 8 to 15 percent slopes, extremely stony
W	Water

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline
- AD HOC BOUNDARY (label)
- Small airport, airfield, park, oilfield, cemetery, or flood pool

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate
- Federal
- State
- County, farm or ranch

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label)
- Located object (label)
- Tank (label)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial
- Intermittent

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

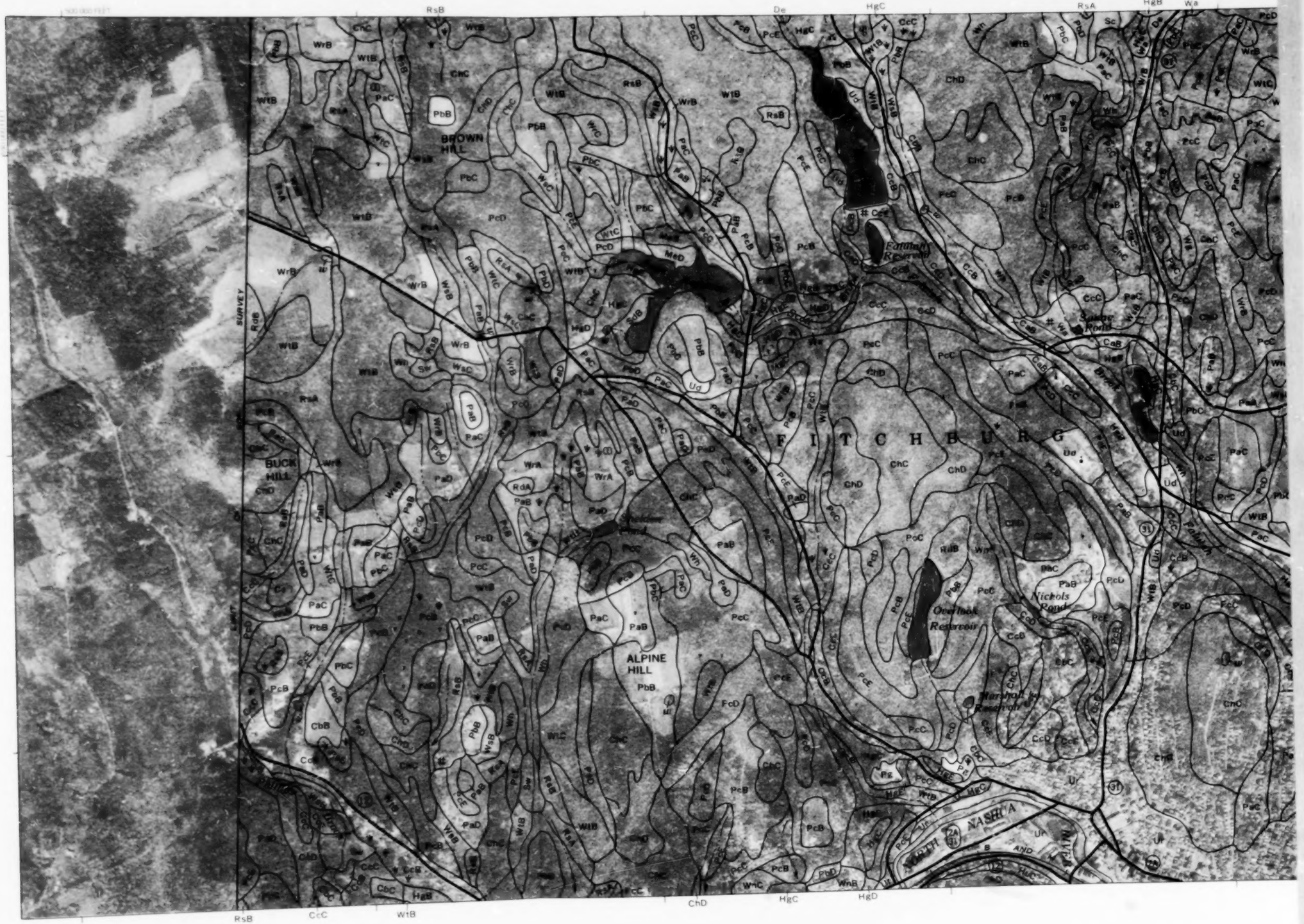
GULLY

DEPRESSION OR SINK

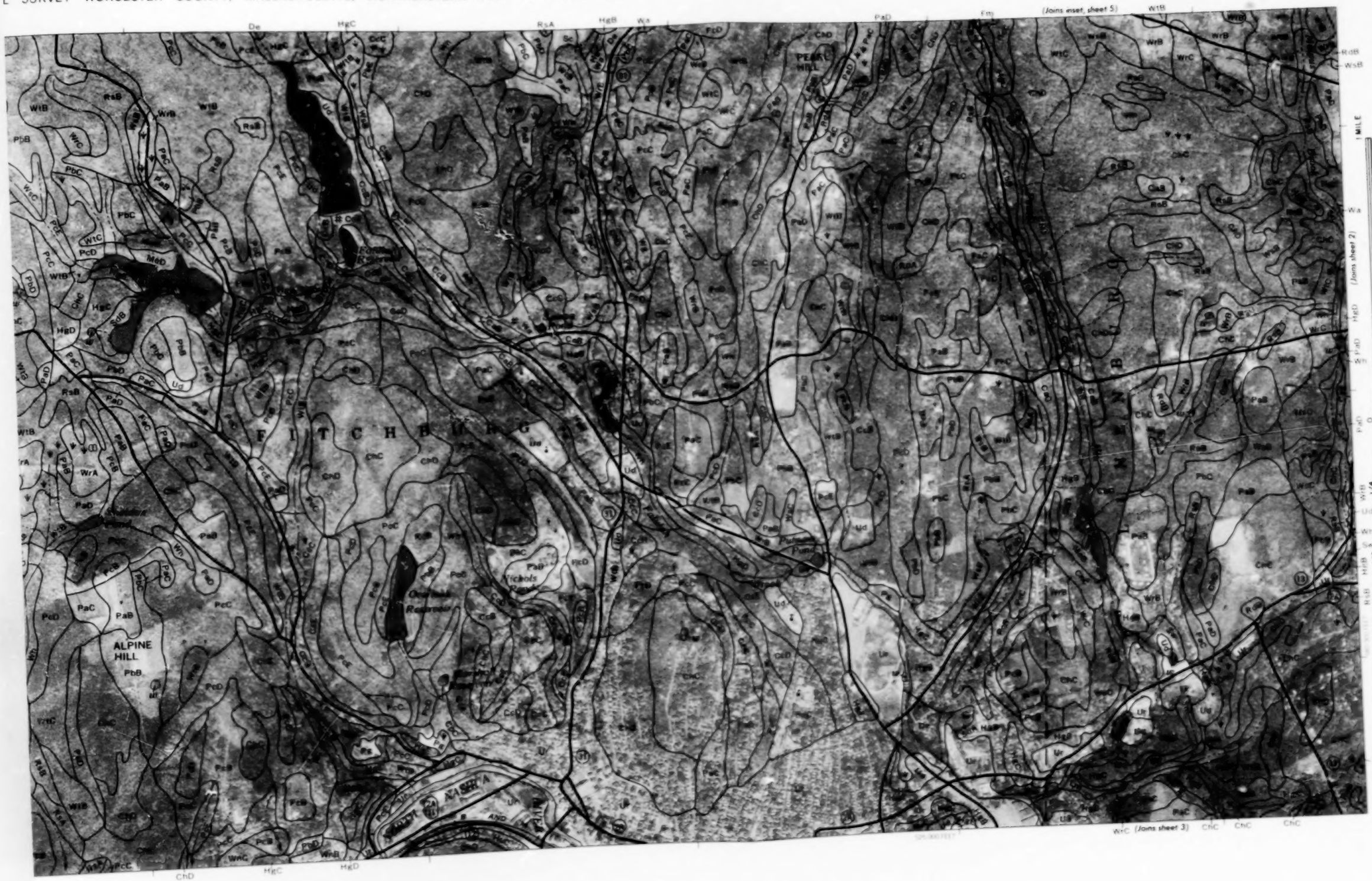
SOIL SAMPLE SITE (normally not shown)

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Stripped land


SURVEY
BROWN HILL
BUCK HILL
ALPINE HILL
Overlook Reservoir
Nichols Pond
Marshall Pond
Falulah Reservoir
Salem Pond
FITCHBURG
NASHUA
RsB
CcC
WtB
ChD
HgC
HgD

L SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET NUMBER 1



N
1 MILE
1 KILOMETER
Scale 1:20,000
(Joins inset, sheet 4)
(Joins sheet 1)
(Joins sheet 4)
MIDDLESEX COUNTY
WORCESTER COUNTY
LUNENBURG
Hickory Hills Lake
Lunenburg
Goodrich Hill
CLARKS HILL
WgB HILL
HUNTING HILL
FLAT HILL
Whitney Pond
Mulpus Brook
Phillips Brook
Wg
Sw
Ud
Wh
WrB
WrA
WsB
WsC
RsB
RdA
RdB
HgB
ChC
ChD
CbB
CbC
CbD
CaC
CaD
PaB
PaC
PaD
PaE
PbC
PbD
PeC
QnA
QnB
QnC
QnD
QnE
QmB
Fm
Fp
Pe
Pm
Sc
SdA
SdB
De
HaB
HaC
HaD
HaE
HbC
HbD
HbE
HcC
HcD
HcE
HeD
HeE
MaB
MaC
MaD
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MkB
MkC
MkD
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MmC
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MmE
MnB
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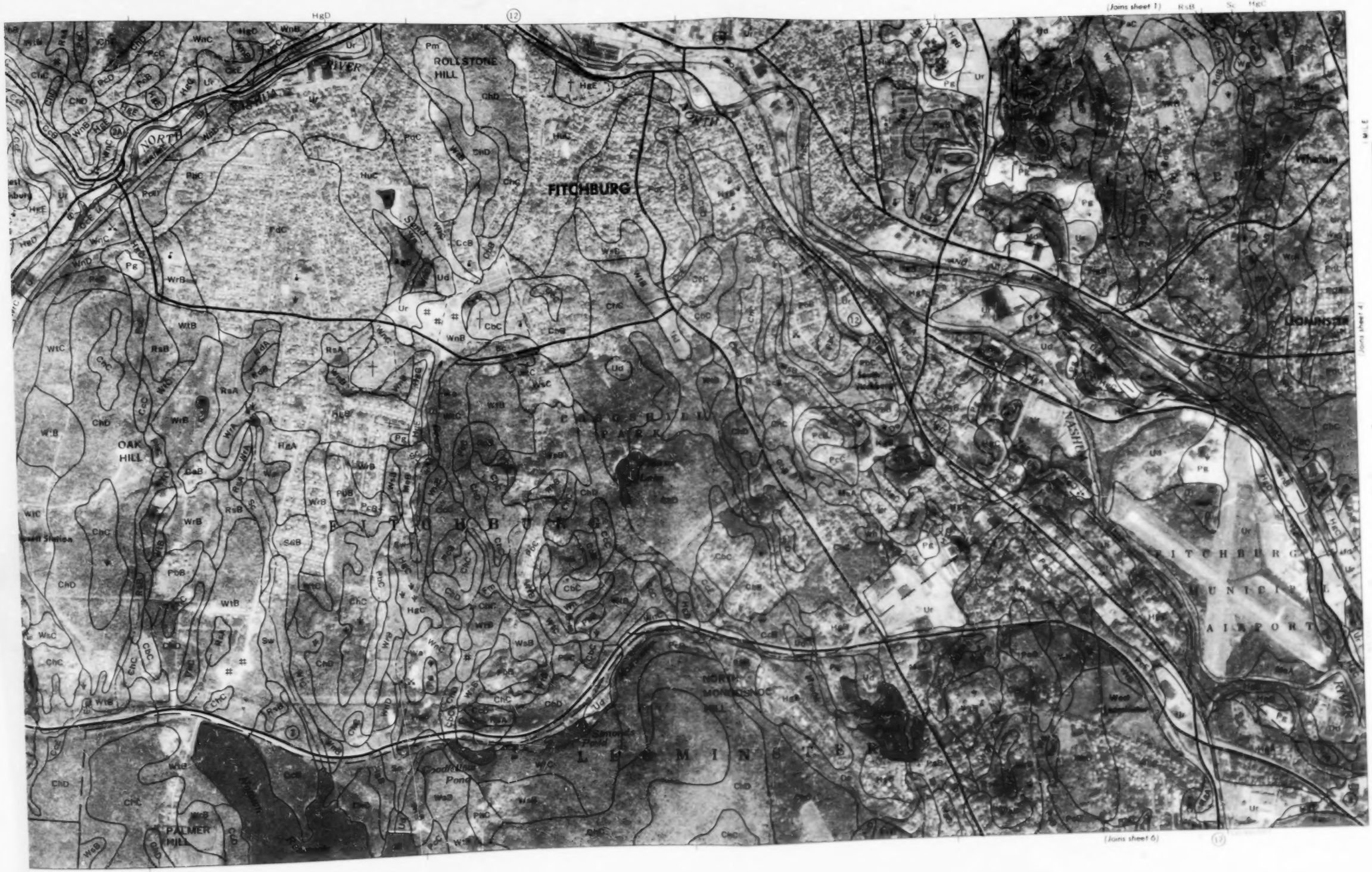
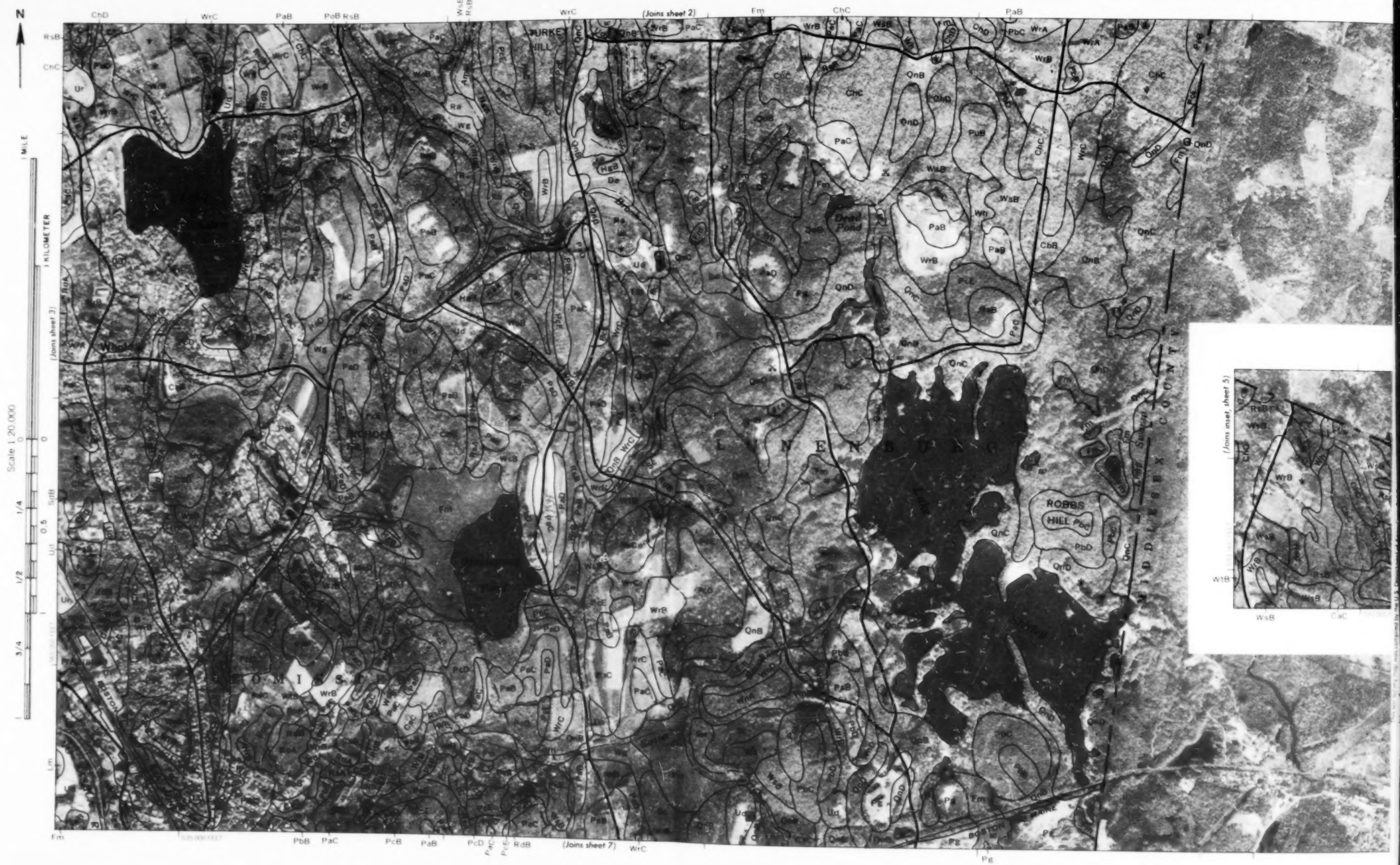
MnD
MnE
MoB
MoC
MoD
MoE
MpB
MpC
MpD
MpE
MrB
MrC
MrD
MrE
MsB
MsC
MsD
MsE
MtB
MtC
MtD
MtE
MuB
MuC
MuD
MuE
MvB
MvC
MvD
MvE
MwB
MwC
MwD
MwE
MxB
MxC
MxD
MxE

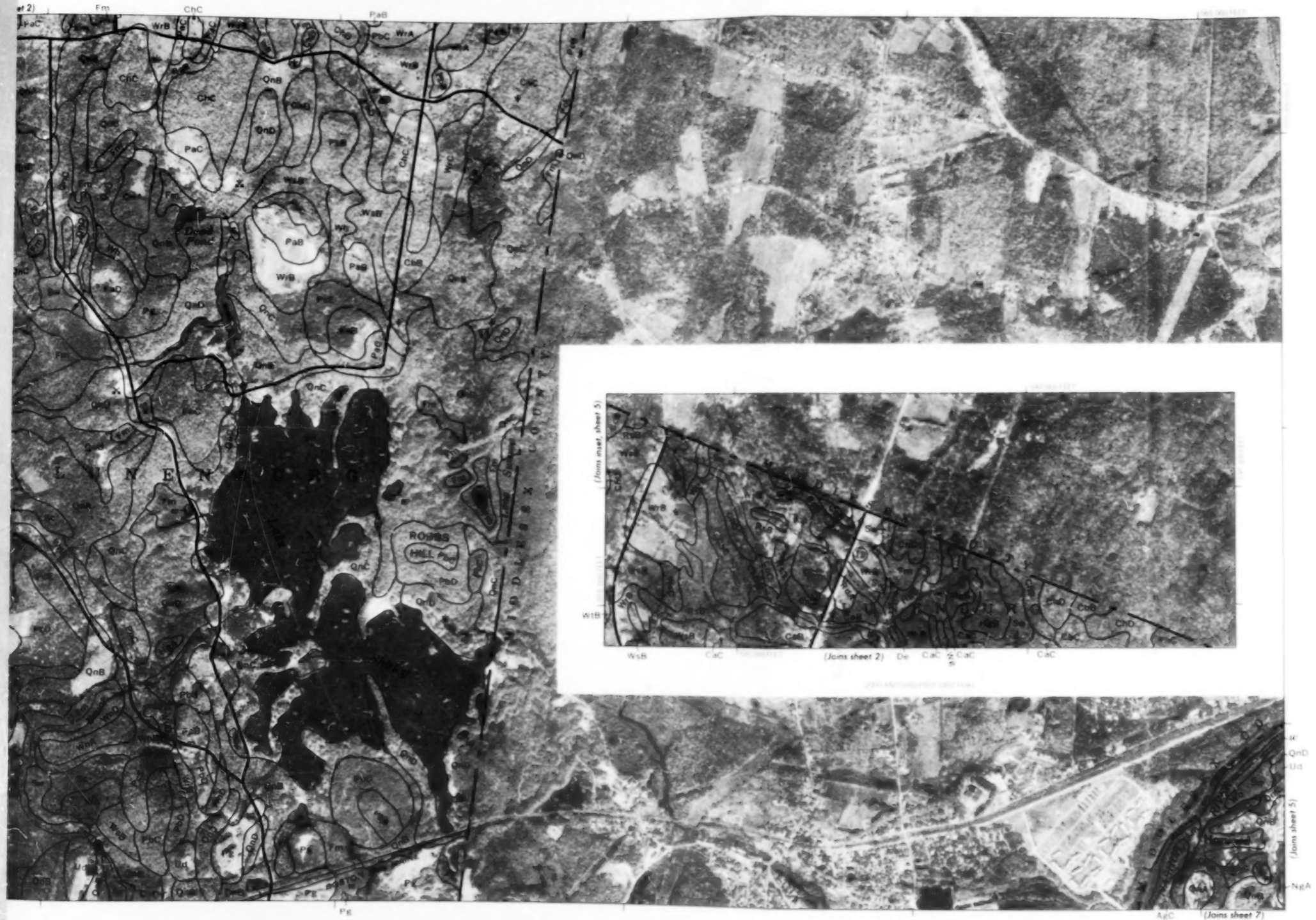
SOIL SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET NUMBER 2

FITCHBURG
ROLLSTONE HILL
PARKER HILL
OAK HILL
PALMER HILL
NORTH
RIVER
Meadow Brook
Wachusett Reservoir
Goodrellum Pond
Summers Pond
Phillips Brook
Nashua
Corner
Pg
WnC
WnB
WnD
HgE
HgC
HgD
CcD
CbC
CcB
ChD
ChC
PcC
PcD
RsA
RsB
WtB
WtC
WsB
WsC
PbB
PbC
SdB
Ud
Ur
Pm
Sw
Wa
Em
Pond

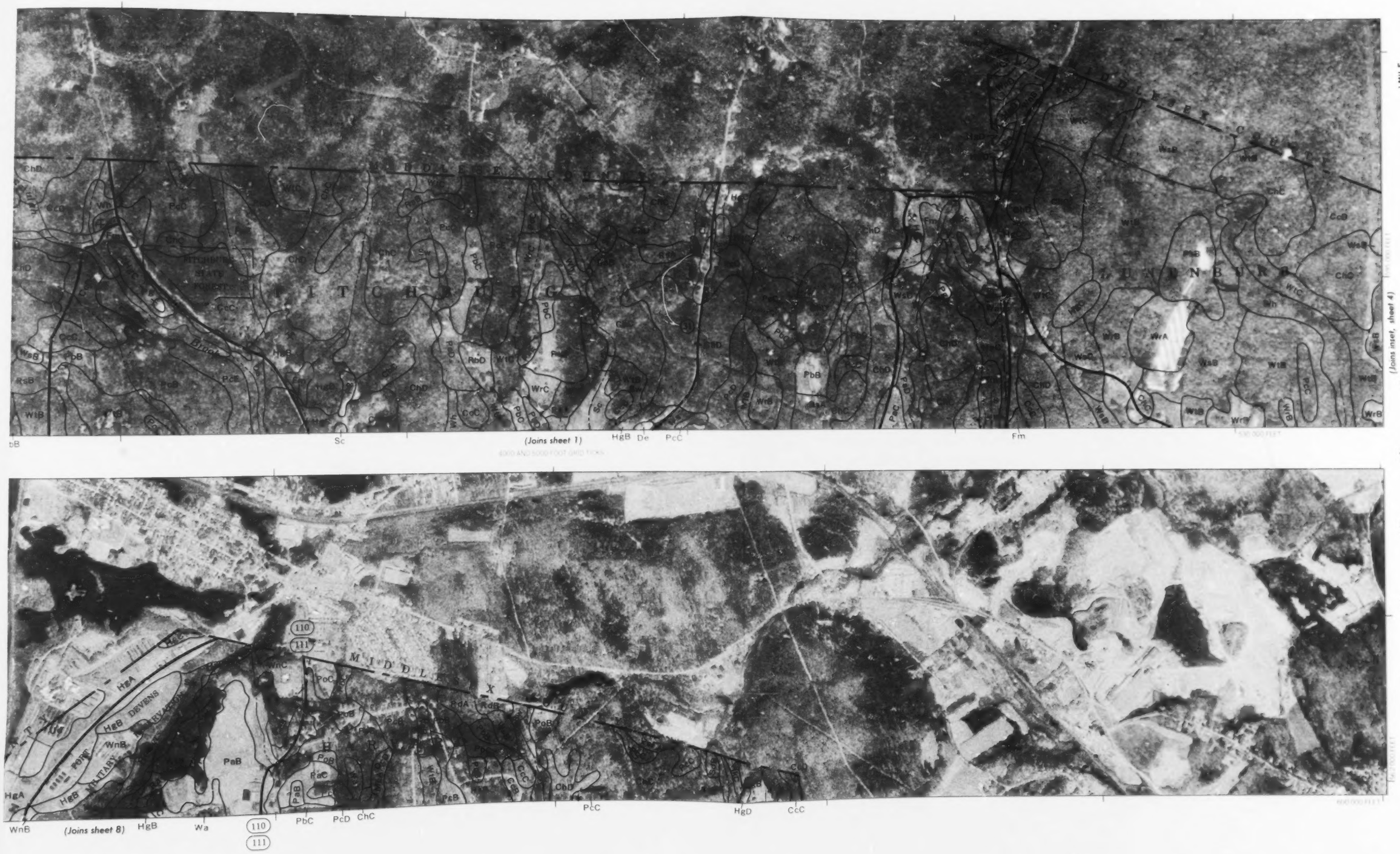
L SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET NUMBER 3




N
Scale 1:20,000
1 MILE
1 KILOMETER
(Joins sheet 2)
(Joins sheet 3)
(Joins sheet 7)
(Joins inset, sheet 5)
PURKEY HILL
Wheeler
Pond
Dowse Pond
ROBBS HILL Pond
Stetson
Boston
Providence
Fm
PbB
PaC
PcB
PaB
PcD
RdB
WrC
Pg
WsB
CaC
WtB


(Joins sheet 2)
Fm
ChC
PaB
WrB
WrA
OnB
OnC
OnD
PaC
WsB
ChB
Pe
Ud
Ug
QnB
QnC
QnD
ROSS HILL
(Joins inset, sheet 5)
(Joins sheet 2)
(Joins sheet 5)
(Joins sheet 7)
AgC
NgA

MIDDLESEX
PITCHBURG
STATE FOREST
DEVENS
RESERVATION
FORT
DEVENS
MILITARY
RESERVATION
Brook
(Joins sheet 1)
(Joins sheet 4)
(Joins sheet 8)
110
111
PaD
PaB
PbC
PbB
PcB
PcC
PcD
RdA
RdB
RsB
ChC
ChD
WrC
WrB
WnB
WnC
HgB
HeB
HeA
HgA
QnA
QnB
QnC
QnD
NgA
ScA
CcB
WnA
Wo
Ud
Sc
Wa


5
N
1 MILE
1 KILOMETER
Scale 1:20,000
(Joins inset, sheet 4)
(Joins sheet 1)
(Joins sheet 8)
MIDDLESEX COUNTY
WORCESTER COUNTY
FITCHBURG
TOWNSEND
PITCHBURG STATE FOREST
MILITARY RESERVATION
DEVENS
Brook
110
111
X

(Joins sheet 3)

N

Scale 1:20,000

1 MILE 1/4 1/2 3/4

1 KILOMETER 0.5 1

1000 0 1000 2000 3000 4000 5000 FEET

SOIL SURVEY LIMIT

L E O M I N S T E R

SOUTH MONOOSNOC HILL

CARTER HILL

BAYBERRY HILL

LONG HILL

Beaver Pond

Haynes Reservoir

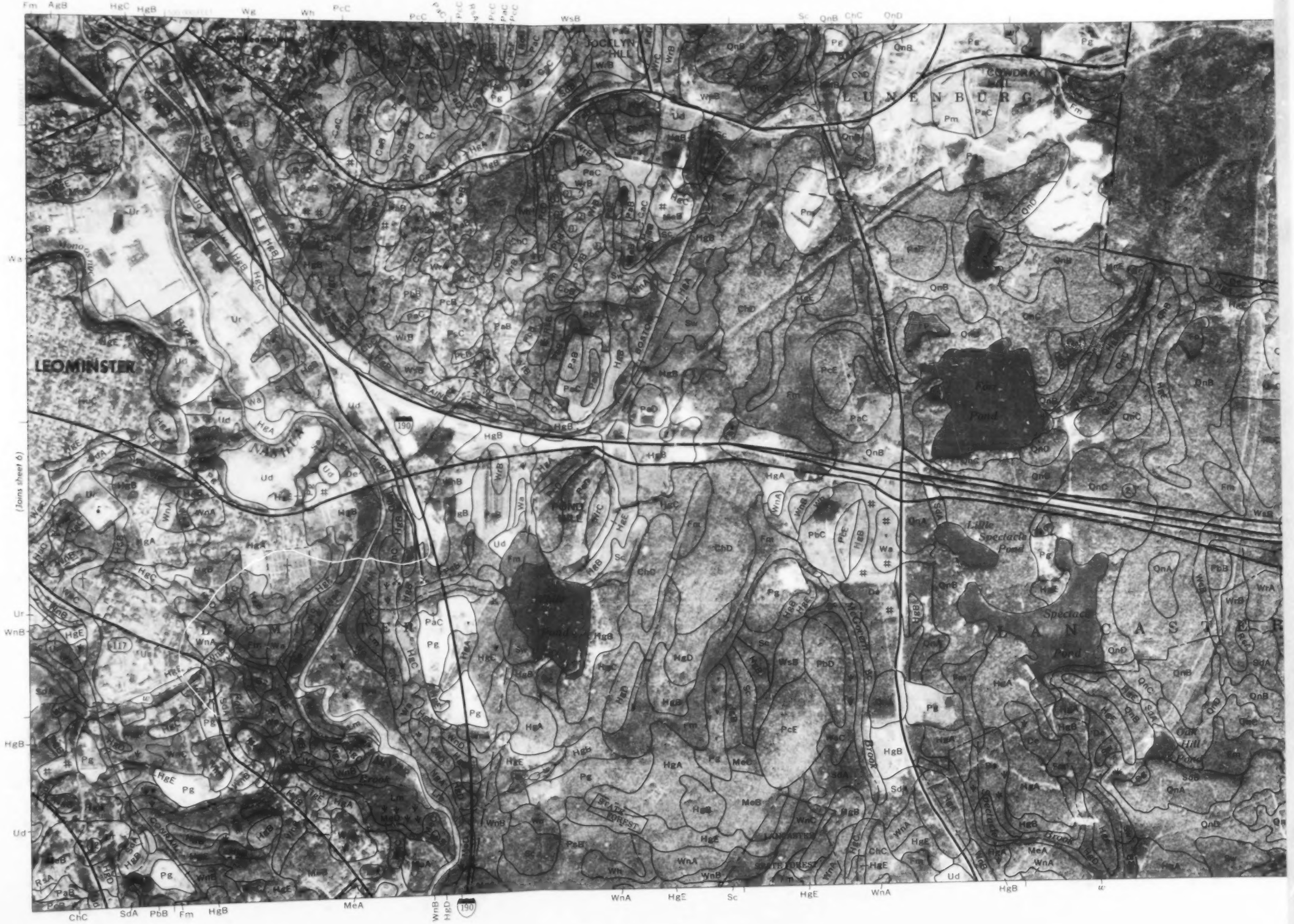
Monoosnoc Reservoir

Fall Brook

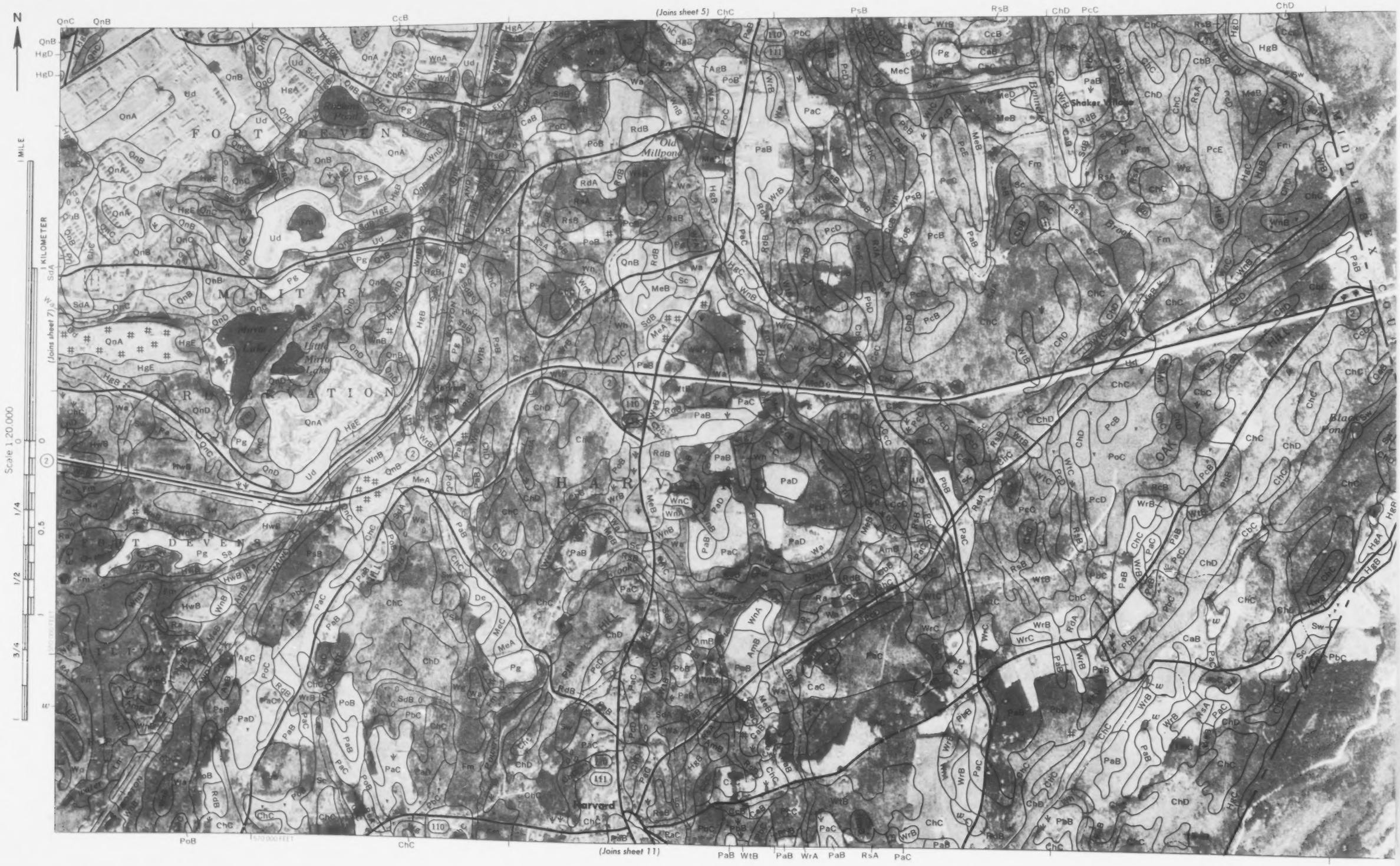
WtB CcD CcD RsB WtB ChC PbB Ud PaC

(Joins sheet 9)

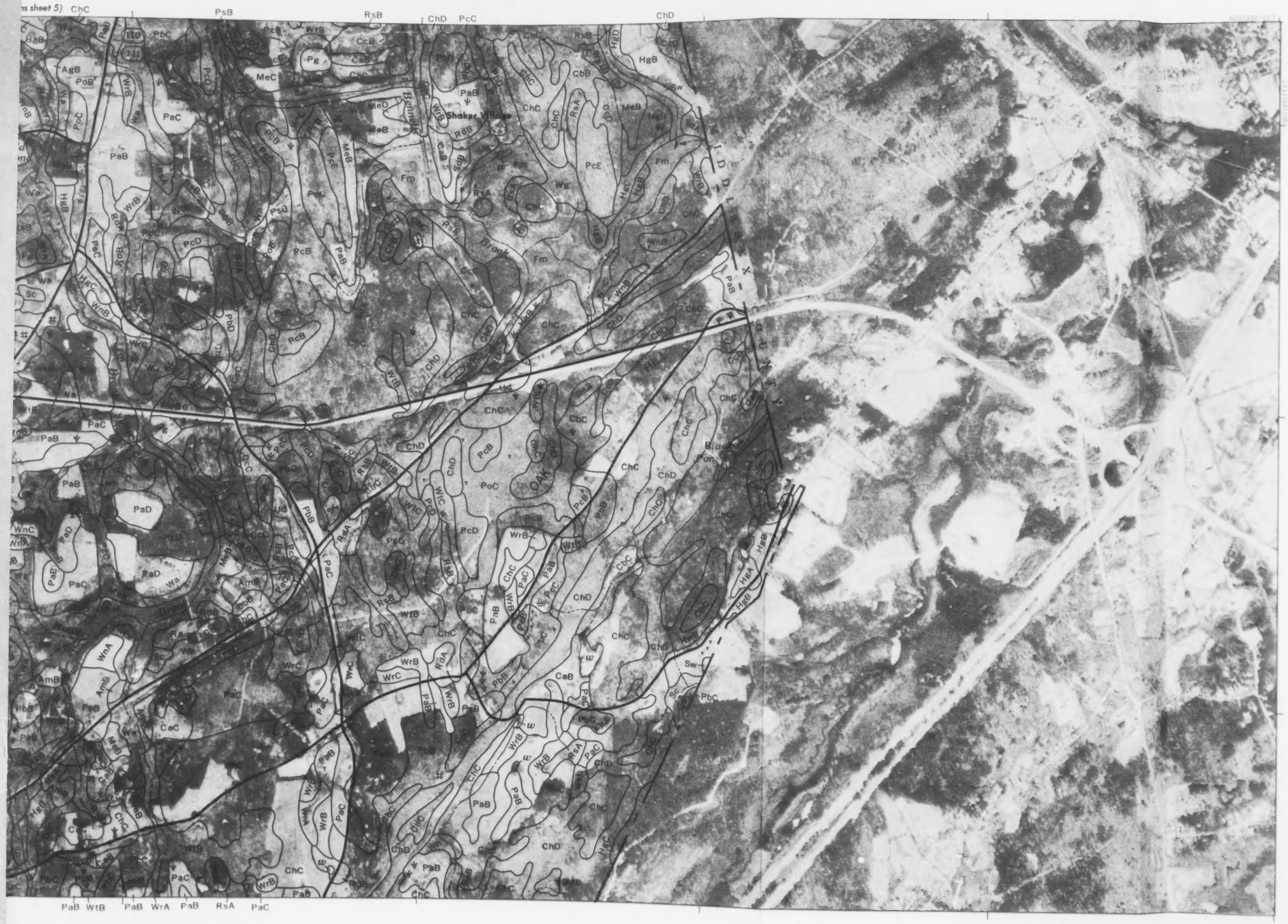
SOIL SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET NUMBER 6


LEOMINSTER
LUNENBURG
LANCASTER
JOCELYN HILL
CONDRAY
Pond
Little Spectacle Pond
Spectacle Pond
Oak Hill Pond
STATE FOREST
Brook
McCrokery
Fm
HgB
HgA
HgC
HgE
WnA
WnB
WsB
PcC
PaC
PaB
PcE
PbB
PbC
PbD
QnB
QnC
QnD
ChC
ChD
SdA
MeA
MeB
MgB
MgD
Pg
Pm
Sc
Ud
Ur
Wa
Wg
Wh
Ws
190
117

WsB
JOCELYN HILL
Sc
QnB
ChC
QnD
(Joins sheet 4)
QnA
LUMENBURG
MIDDLE
COUNTY
TREASURY
SHARP HILL
POND HILL
White Pond
Little Spectacle Pond
Spectacle Pond
LANCASTER
Hill Pond
STATE FOREST
McGovern
Cranberry Pond
MILITARY RESERVATION
(Joins sheet 8)
(Joins sheet 10)
WnA
HgE
Sc
HgE
WnA
HgB
WnB
WnC
N
1 MILE
1 KILOMETER
Scale 1:20,000


N
1 MILE
1 KILOMETER
Scale 1:20,000
0
0.5
1
(Joins sheet 5)
(Joins sheet 7)
(Joins sheet 11)
FORT DEVENS
MILITARY RESERVATION
HARVARD HILL
MIDDLE
Old Millpond
Mirror Lake
Little Mirror Lake
Shaker Village
Black Pond
Bennett Brook
Harvard
OAK
110
111
141
2
QnA
QnB
QnC
QnD
HgB
HgD
HgE
Ud
Pg
Sc
Wa
WnA
WnB
WnC
WnD
SdA
SdB
RdA
RdB
PoB
PoC
PaB
PaC
PaD
PbC
PcB
PcC
PcD
PcE
ChC
ChD
CaB
CaC
CbB
CbC
CcB
CcC
MeA
MeB
MeC
MeD
MeE
RsA
RsB
WtB
WtC
WrA
WrB
WrC
AgB
AgC
AmB
HwB
HaB
HaC
HbB
HbC
HcB
HcC
HdB
HdC
HeB
HeC
HfB
HfC
HgA
HgC
Fm
Sw
Ra
De
Rd
Rn
Ru
Sa
Se
Wh
Wr
Ln
Lr
Ls
Lt
Lu
Lv
Lw
Lx
Ly
Lz
Ma
Mb
Mc
Md
Me
Mf
Mg
Mh
Mk
Ml
Mm
Mn
Mo
Mp
Mr
Ms
Mt
Mu
Mv
Mw
Mx
My
Mz
Na
Nb
Nc
Nd
Ne
Nf
Ng
Nh
Nk
Nl
Nm
Nn
No
Np
Nr
Ns
Nt
Nu
Nv
Nw
Nx
Ny
Nz
Oa
Ob
Oc
Od
Oe
Of
Og
Oh
Ok
Ol
Om
On
Oo
Op
Or
Os
Ot
Ou
Ov
Ow
Ox
Oy
Oz
Pa
Pb
Pc
Pd
Pe
Pf
Pg
Ph
Pk
Pl
Pm
Pn
Po
Pp
Pr
Ps
Pt
Pu
Pv
Pw
Px
Py
Pz
Qa
Qb
Qc
Qd
Qe
Qf
Qg
Qh
Qk
Ql
Qm
Qn
Qo
Qp
Qr
Qs
Qt
Qu
Qv
Qw
Qx
Qy
Qz
Ra
Rb
Rc
Rd
Re
Rf
Rg
Rh
Rk
Rl
Rm
Rn
Ro
Rp
Rr
Rs
Rt
Ru
Rv
Rw
Rx
Ry
Rz
Sa
Sb
Sc
Sd
Se
Sf
Sg
Sh
Sk
Sl
Sm
Sn
So
Sp
Sr
Ss
St
Su
Sv
Sw
Sx
Sy
Sz
Ta
Tb
Tc
Td
Te
Tf
Tg
Th
Tk
Tl
Tm
Tn
To
Tp
Tr
Ts
Tt
Tu
Tv
Tw
Tx
Ty
Tz
Ua
Ub
Uc
Ud
Ue
Uf
Ug
Uh
Uk
Ul
Um
Un
Uo
Up
Ur
Us
Ut
Uu
Uv
Uw
Ux
Uy
Uz
Va
Vb
Vc
Vd
Ve
Vf
Vg
Vh
Vk
Vl
Vm
Vn
Vo
Vp
Vr
Vs
Vt
Vu
Vv
Vw
Vx
Vy
Vz
Wa
Wb
Wc
Wd
We
Wf
Wg
Wh
Wk
Wl
Wm
Wn
Wo
Wp
Wr
Ws
Wt
Wu
Wv
Ww
Wx
Wy
Wz
Xa
Xb
Xc
Xd
Xe
Xf
Xg
Xh
Xk
Xl
Xm
Xn
Xo
Xp
Xr
Xs
Xt
Xu
Xv
Xw
Xx
Xy
Xz
Ya
Yb
Yc
Yd
Ye
Yf
Yg
Yh
Yk
Yl
Ym
Yn
Yo
Yp
Yr
Ys
Yt
Yu
Yv
Yw
Yx
Yy
Yz
Za
Zb
Zc
Zd
Ze
Zf
Zg
Zh
Zk
Zl
Zm
Zn
Zo
Zp
Zr
Zs
Zt
Zu
Zv
Zw
Zx
Zy
Zz

SOIL SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET NUMBER 8



500 000 FEET

470 000 FEET

(Joins inset, sheet 18)

495 000 FEET

PbB

PcC

WtB

MOADEN

PcD

PcC

RsB

PaC

PaB

WrB

RtA

PcD

WtB

UdB

PaB

PcC

WORCESTER

Od

TATNUCK HILL

SURVEY

ChC

PbB

(Joins sheet 24)

460 000 FEET

498 000 FEET

3000 AND 5000-FOOT GRID TICKS

Wh CbC CcB WtB CaC Wh RsA PaD

Bartlett Swamp

JUSTICE HILL

Fly Creek Pond

WORCESTER

HgB

PcD WrB PbB

SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET NUMBER 9

N
(Joins sheet 7)
(Joins sheet 9)
(Joins sheet 13)
1 MILE
1 KILOMETER
Scale 1:20,000
LEOMINSTER
PINE HILL
WEKEPEKE HILL
LANCASTER
FORT
MARY
WHITCOMB HILL
BALLARD HILL
RIVER
North Village
535,000 FEET

SOIL SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART -- SHEET NUMBER 10

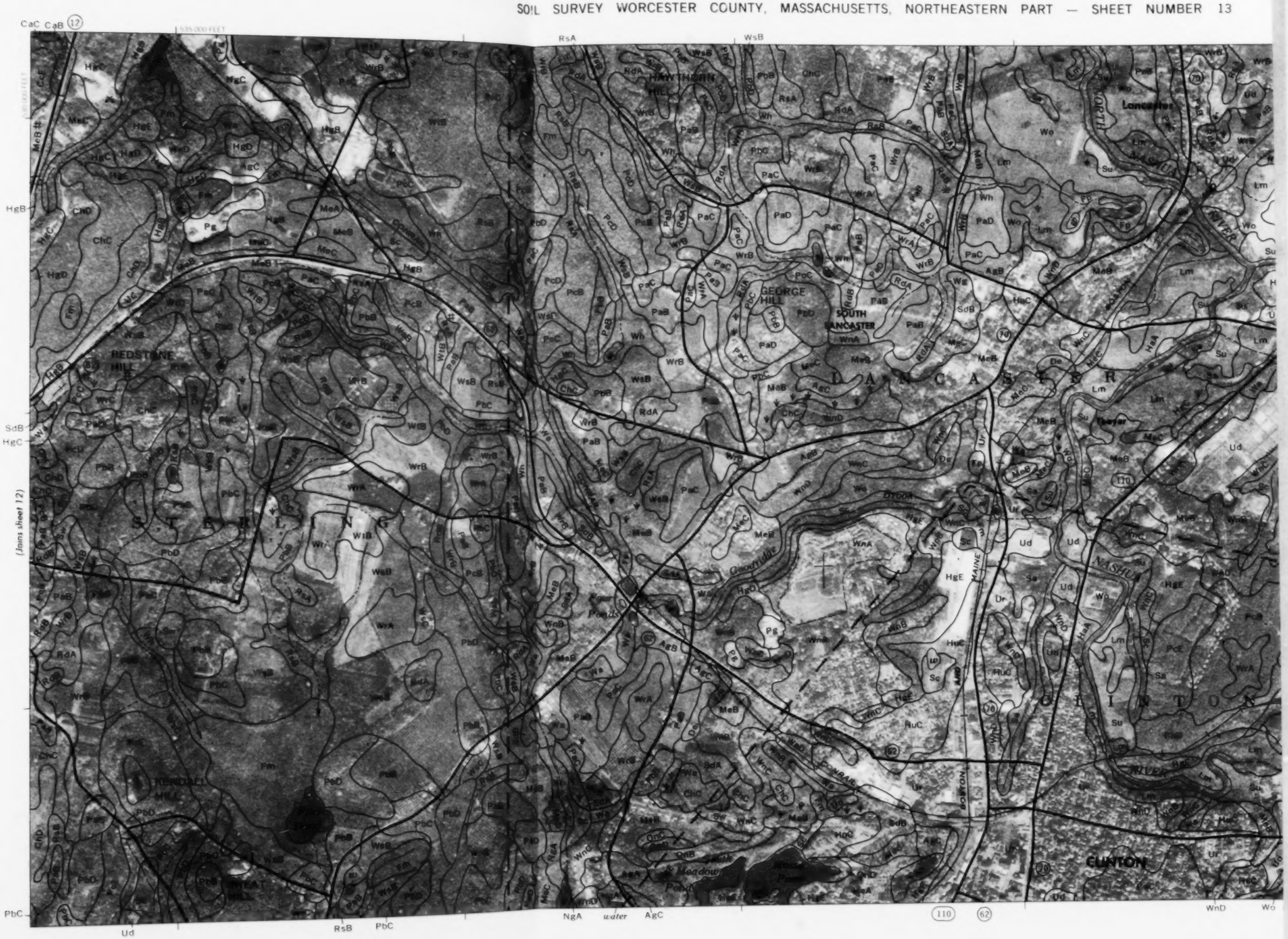
NORTHBOROUGH
WESTBOROUGH
NORTHBOROUGH
SOU

FORT DEVENS
Still River
Harvard
Horse Meadows
HARVARD
BOLTON
VAUGHN HILLS
MIDDLESEX CO.
(Joins sheet 8)
(Joins sheet 10)
(Joins sheet 14)
WnB
RsB
WnC
Fm
Sw
ChC
WsB
ChD
WrB
WtB
PcB
PaB
WrA
PaC
495
110

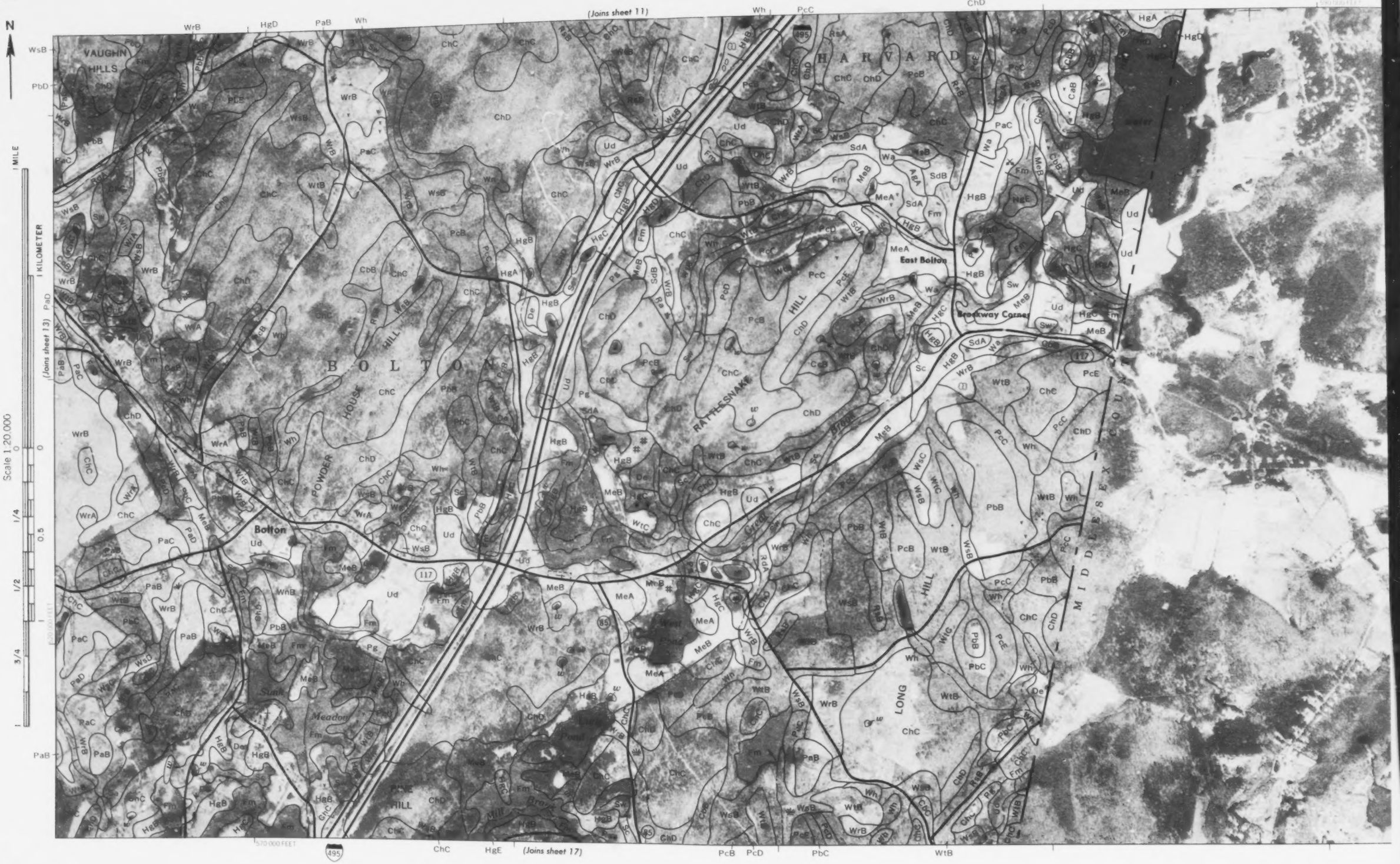
(Joins sheet 8)
Harvard
H A R V A R D
MIDDLESEX COUNTY
WORCESTER COUNTY
495
(Joins sheet 14)
(Joins sheet 17)
BERLIN
Bolton
MIDDLESEX
290
(Joins sheet 20)
(Joins sheet 23)
N
1 MILE
1 KILOMETER
Scale 1:20,000

SOIL SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET N

(140)
PcC
ChC
PbC
PaC
(Joins sheet 9)
PbB
PcB
WsB
CaC
(12)
(62)
ChD
Fm
(Joins sheet 13)
PaB
MeB
CaC
HgB
HgA
Wa
Ud
MeA
MeC
PaC
PcD
HeB
Pg
RsB
WnB
HgC
SuA
WnC
MeD#
Sc
(Joins sheet 15)
PbB


CaC CaB (12)
535 000 FEET
RsA
WsB
HgB
SdB
HgC
(Joins sheet 12)
REDSTONE HILL
STERLING
KENDALL
HAWTHORN HILL
GEORGE HILL
SOUTH LANCASTER
DAGGETT
Lancaster
NORTH
RIVER
Meyer
NASHUA
CLINTON
BOSTON
MAINE
Meadow Pond
Ponds
PbC
Ud
RsB
PbC
NgA
water
AgC
110
62
WnD
Wo

L SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET NUMBER 13

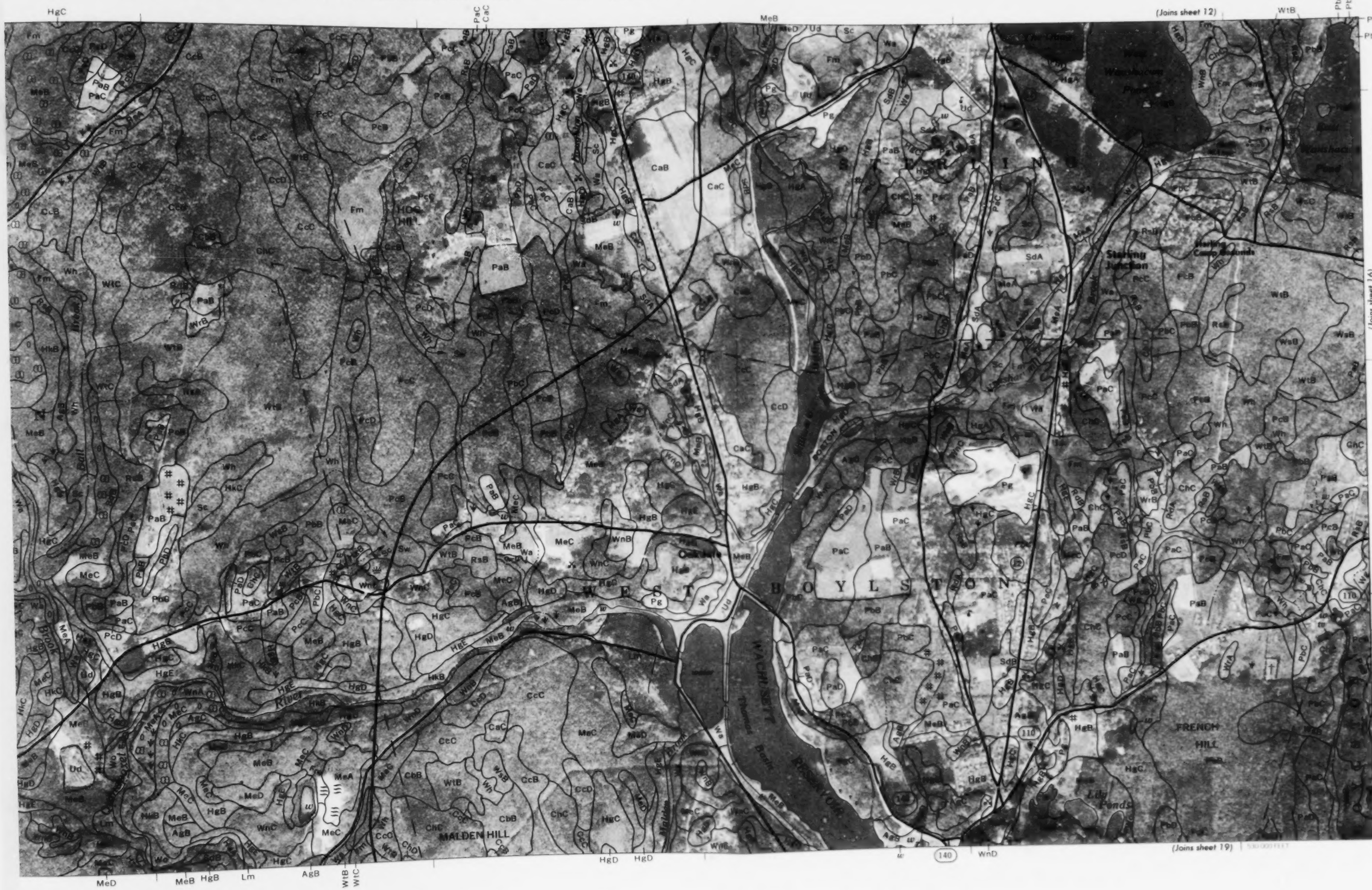

N
Scale 1:20,000
1 MILE
1 KILOMETER
(Joins sheet 11)
(Joins sheet 13)
(Joins sheet 17)
VAUGHN HILLS
HARVARD
BOLTON
East Bolton
Brockway Corner
Bolton
Sunk Meadow
HOUSE HILL
POWDER HILL
RATTLESNAKE BROOK
LONG HILL
MIDDLESEX CO.
495
117
85
WrB
HgD
PaB
Wh
WsB
PbD
ChC
ChD
PcC
PcB
PcD
PbC
WtB
HgB
HgE
HgA
PaC
WsC
WtC
PbB
PcE
WrA
ChE
CaB
CbB
Ud
Fm
MeB
MeA
SdA
SdB
Wa
AgA
Sw
Sc
De
Pg
RaA
RaB
WtG
WsD
WnB
CtC
Ct
Cr
Brook
Creek
Mill
Swamp
Pond
Quarry
Gravel Pit
Dump
Cemetery
Church
School
Tank
Tower
Station
Power Line
Railroad
Road
Trail
Bridge
Dam
Spring
Well
Boundary
Stream
Intermittent Stream
Canal
Lake
Marsh
Swamp
Orchard
Vineyard
Nursery
Urban
Built-up
Open Space
Recreation
Water
Wetland
Forest
Agriculture
Residential
Commercial
Industrial
Transportation
Utilities
Mining
Waste
Vacant
Unknown
Other
Special
Miscellaneous
Undefined
Undefined
Undefined

HARVARD
HILL
East Bolton
Brookway Corner
RATTLESNAKE
LONG
HILL
MIDDLESEX COUNTY
Wh
PcC
ChD
HgA
HgC
HgB
ChC
RsA
RsB
WtB
WrB
Ud
SdA
Wa
MeB
AsA
SdB
MeA
Fm
PbB
PcB
PcD
PcE
CaB
Sw
WsB
WsC
WtC
PaC
PbC
RdA
Sc
Ce
Cr
Ma
Pa
Pe
Pg
Pm
Pw
Rd
Rs
Ts
Wm
Wn
Ws
Wt
Ww
Ya
Yb
495
117
30
9

MIDDLESEX COUNTY
PINE HILL
NORTHBORO
SUDBURY RESERVOIR
CONRAIL
(Joins sheet 23)
(Joins sheet 26)
WrB
PaB
RdA
Fm
PcC
PcB
PcD
PbC
PaC
WtB
RsB
CaB
CaC
RdB
Ud
Wa
Wh
Ma
Pa
Pe
Pg
Rd
Rs
Ts
Wm
Wn
Ws
Wt
Ww
Ya
Yb
30
9

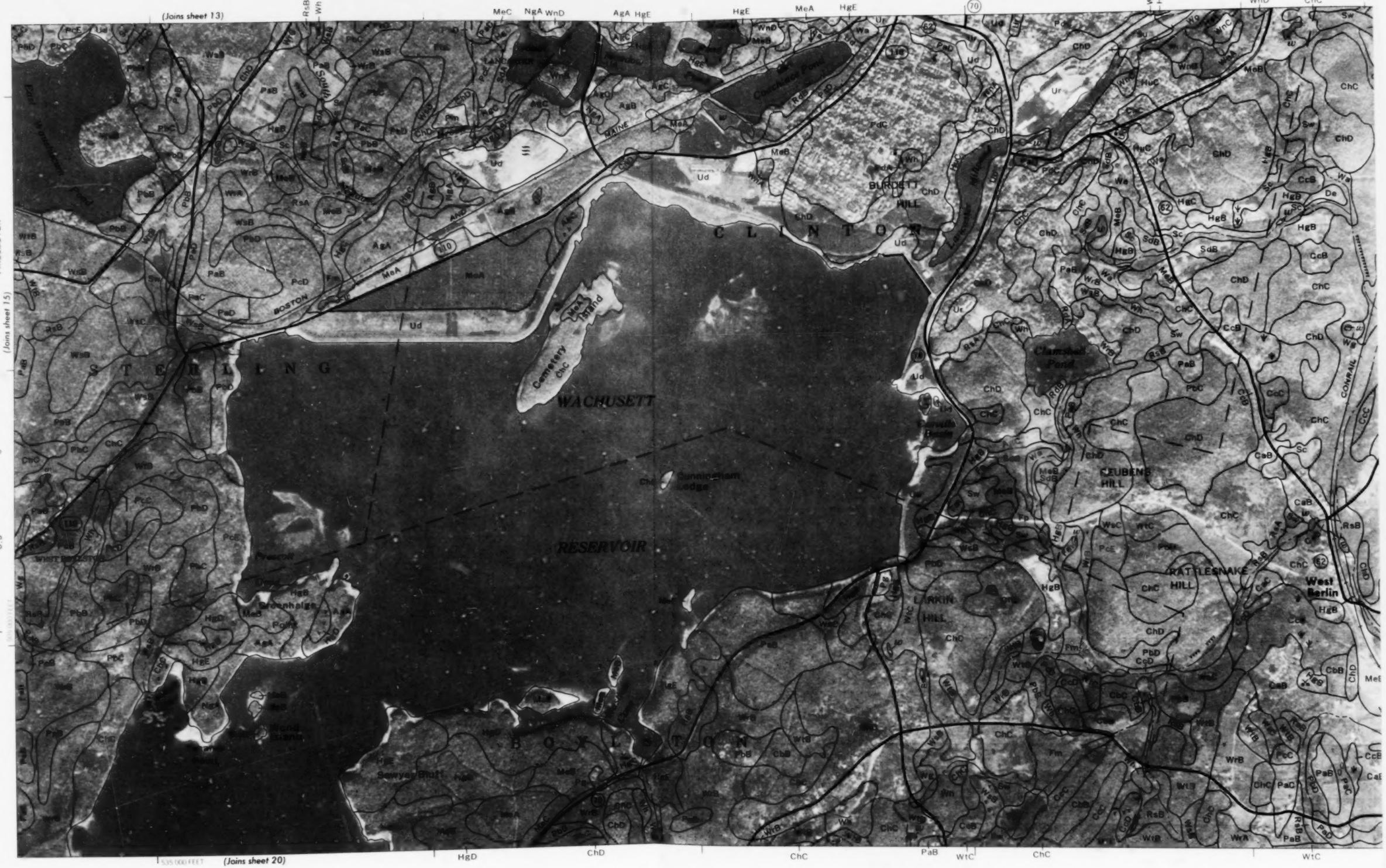
500,000 FEET
HOLT HILL
MALDEN HILL
WEST
(Joins inset, sheet 17)

L SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET NUMBER 15



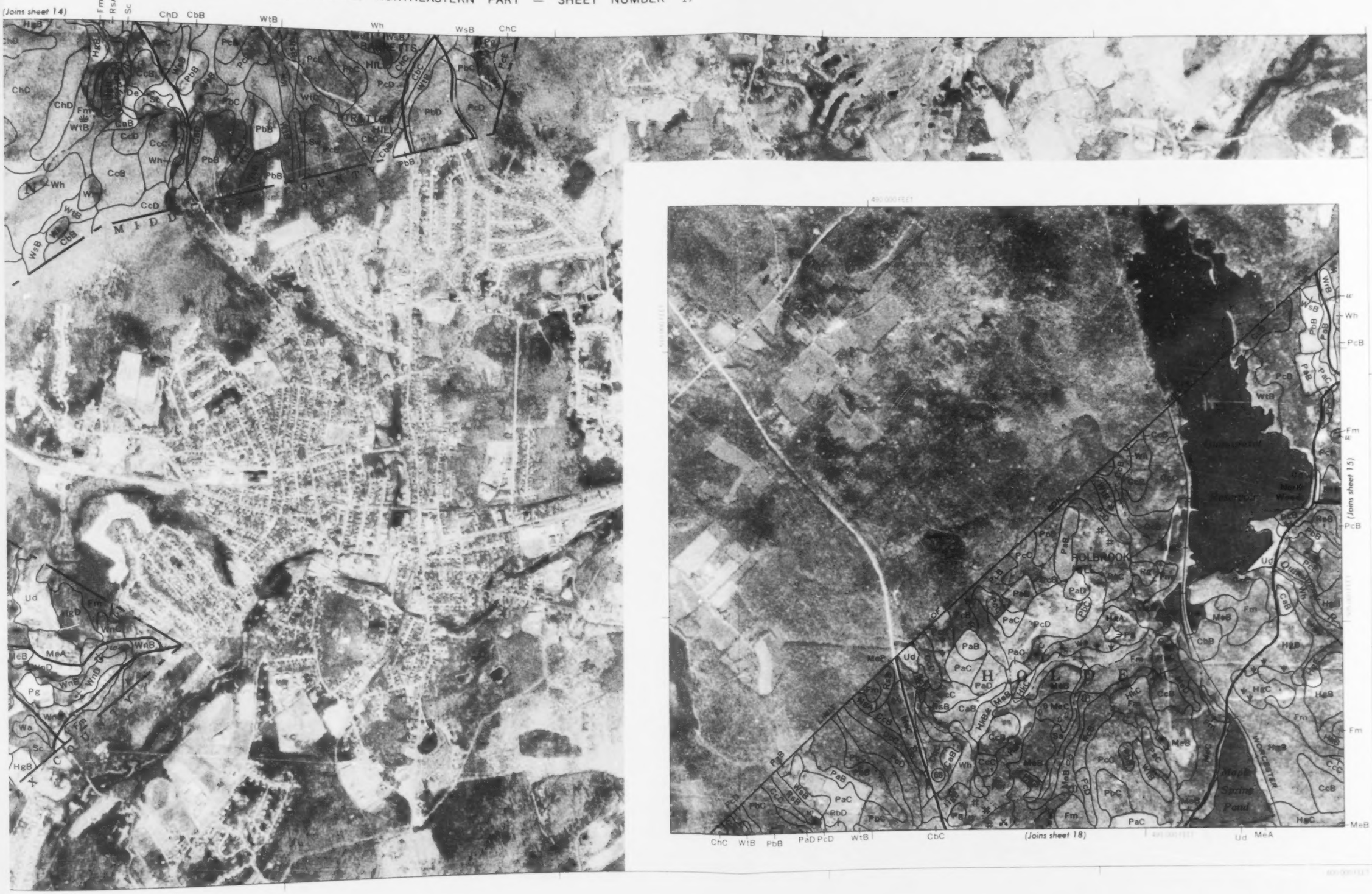
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are photomosaics prepared by the U.S. Department of Interior, Geological Survey from 1977 aerial photographs. Cartographic and technical assistance was provided by the Commonwealth of Massachusetts, Department of Public Works and the Massachusetts Department of Environmental Management.

SOIL SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET N



SOIL SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET NUMBER 16

570,000 FEET
575,000 FEET
(Joins sheet 14)
(Joins sheet 16)
(Joins inset, sheet 11)
BOLTON
BERLIN
SPECTACLE HILL
WHEELER HILL
STRETTON HILL
MIDDLE
HgB
HgB Fm HgC
ChC
ChD
PcE Fm
Fm RsA Sc
ChD CbB
WtB
Wh
WsB
ChC
RdB
WsB
RsB
HgD
Sc
HgC
PbB
ChD
PbB
ChD
WsB


(Joins sheet 14)
(Joins sheet 15)
(Joins sheet 18)
HOLBROOK
MIDDLE
QUINCY
HILL
BASSETTS
HILL
Quinapoxet
Reservoir
Muddy
Spring
Pond
WORCESTER
490,000 FEET
N
1 MILE
1 KILOMETER
0
1/4
1/2
3/4
0.5

N

Scale 1:20,000

1 MILE

1 KILOMETER

ChC
PcD
PaD
PbD
PaC
CbC
(Joins inset, sheet 17)
PcC
MeA
MeB
Maple Spring Pond
HgC
HgB
Ud
PaC
RsA
ChC
Wh
RsB
122A
PbB
CaB
Fm
CbC
PcC
Sw
Pm
DAVIS HILL
WtB
PcB
PbC
WsB
PaB
SMITH HILL
SAPSUCKER HILL
KINDALE HILL
Johnson
SdB
HkC
CbC
CaC
MeC
(Joins sheet 19)
480 000 FEET
(Joins inset, upper left)
(Joins inset, sheet 21)
CcB
CcD
Brook
ChD
(Joins inset, sheet 9)

SOIL SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET NUMBER 19

L SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET NUMBER 19

N
1 MILE
1 KILOMETER
Scale 1:20,000
0
0.5
1
(Joins sheet 16)
(Joins sheet 19)
(Joins sheet 22)
WACHUSETT RESERVOIR
BOLTON
NORTH
GREEN HILL
Scotland Swamp
FAGGOT HILL
TOWER HILL
KENDALL HILL
SCAR HILL
BLUFFS
PULPIT HILL
APRON HILL
DIAMOND HILL
Pine Swamp
Meadow
WOODS
BARNES HILL
PISGAH
BALL HILL
STILES
LOWSLEY HILL
535,000 FEET
290
140
70
117
40

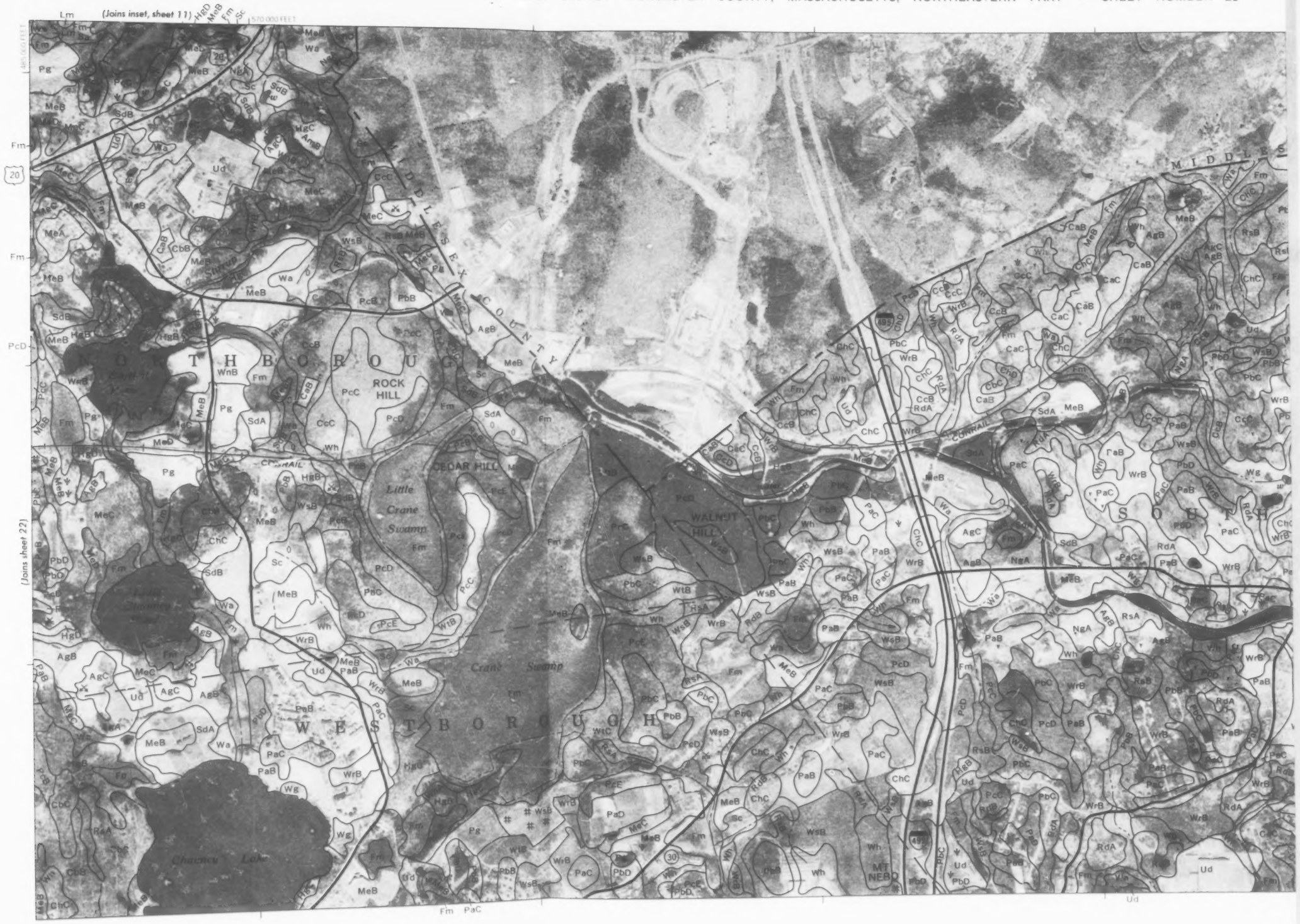
SOIL SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET NUMBER 20

500 000 FEET
HgB
MeB
WrB
HgC
CcC
WsB
CcC
190
Tatnuck Brook
Holden Reservoir Number 1
HOLDEN
STONEHOUSE HILL
WINTER HILL
INDIAN HILL
STRATTON HILL
Ud
Ur
(Joins inset, sheet 18)

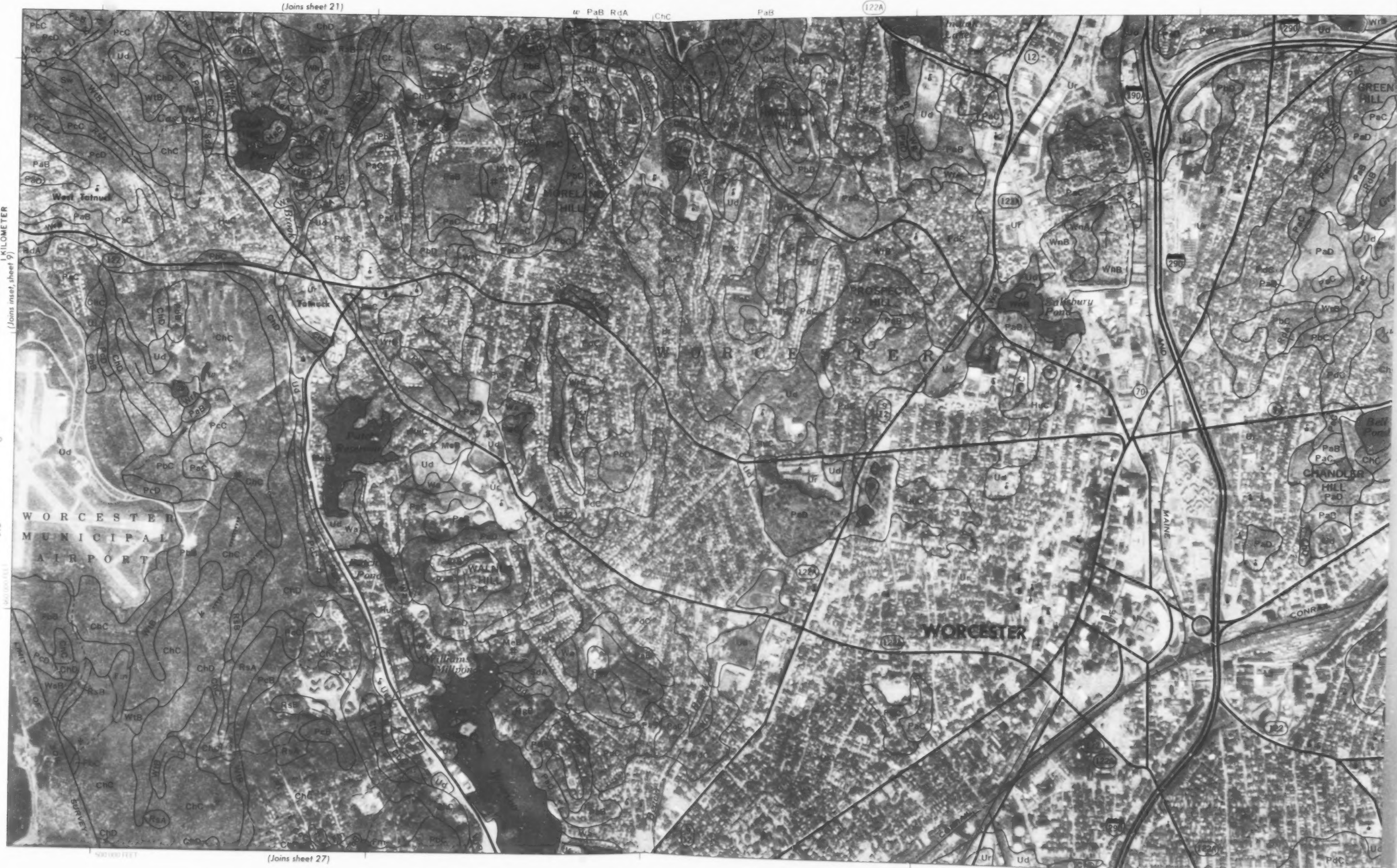
L SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET NUMBER 21

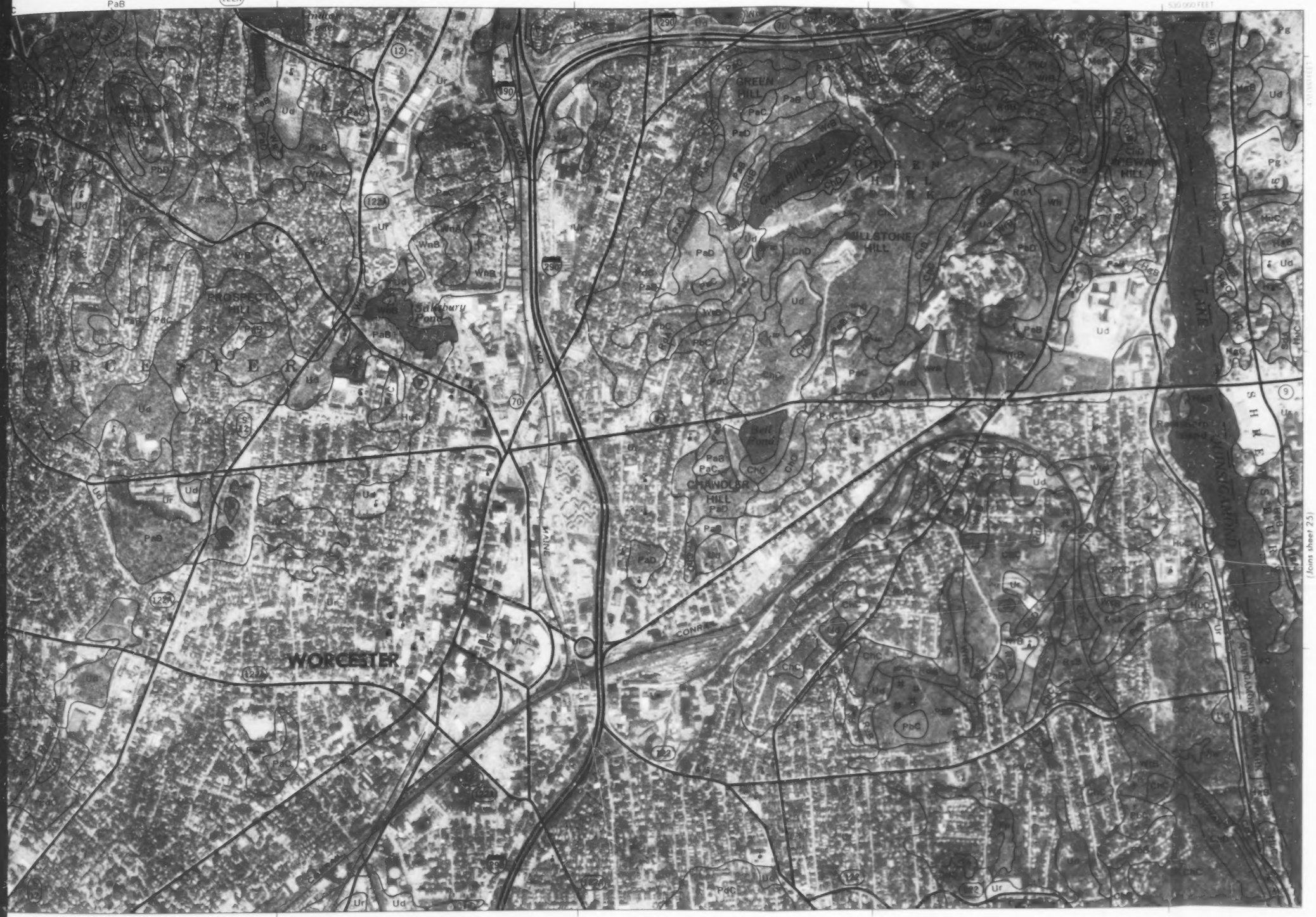
(Joins sheet 20)
PcB
PbB PcC
MeB
BARNARD HILL
Northborough Reservoir
BARTLETT HILL
HAWSON HILL
CHESTNUT HILL
EAY HILL
BOYLSTON
NORTHBORO
SHREWSBURY
SEWALL HILL
Slocum Meadow
UNION HILL
TOMBLIN HILL
Brook
River
Hill
Pond
(Joins sheet 21)
(Joins sheet 25)
535,000 FEET
1 MILE
1 KILOMETER
0
0.5
140
290
20

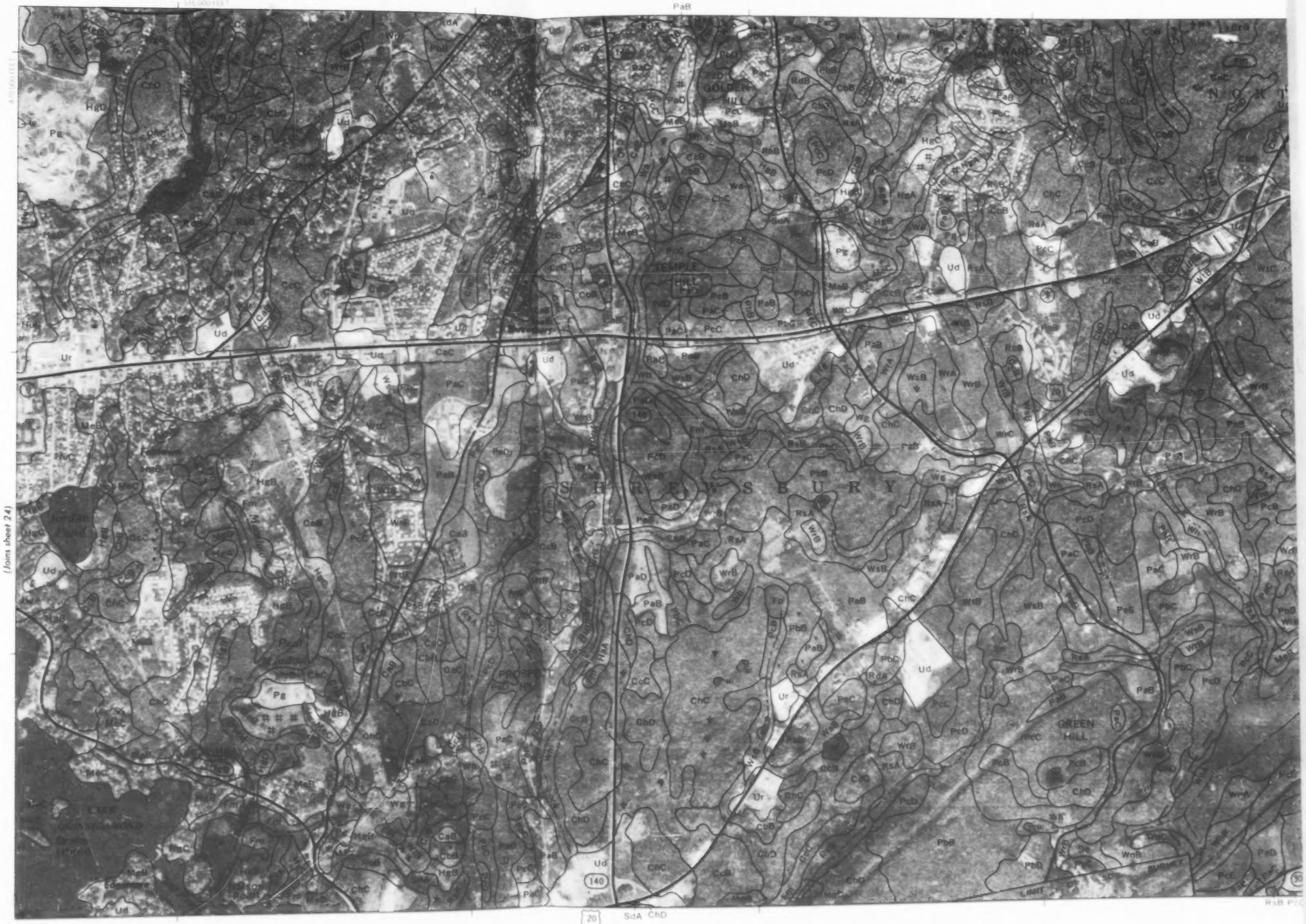
BARNARD HILL
BARTLETT HILL
FAY HILL
CHESTNUT HILL
UNION HILL
TOMBLIN HILL
ROCK HILL
MT ASSABET
NORTHBOROUGH
Northborough Reservoir
Howard Brook
Cold Brook
Ware River
Smith Pond
20
135
(Joins sheet 23)


(Joins inset, sheet 11)
570 000 FEET
(Joins sheet 22)
NORTHBOROUGH
WESTBOROUGH
SOUTHBOROUGH
MIDDLESEX COUNTY
ROCK HILL
CEDAR HILL
WALNUT HILL
Little Crane Swamp
Crane Swamp
Chauncy Lake
CONRAIL
MT NEBO

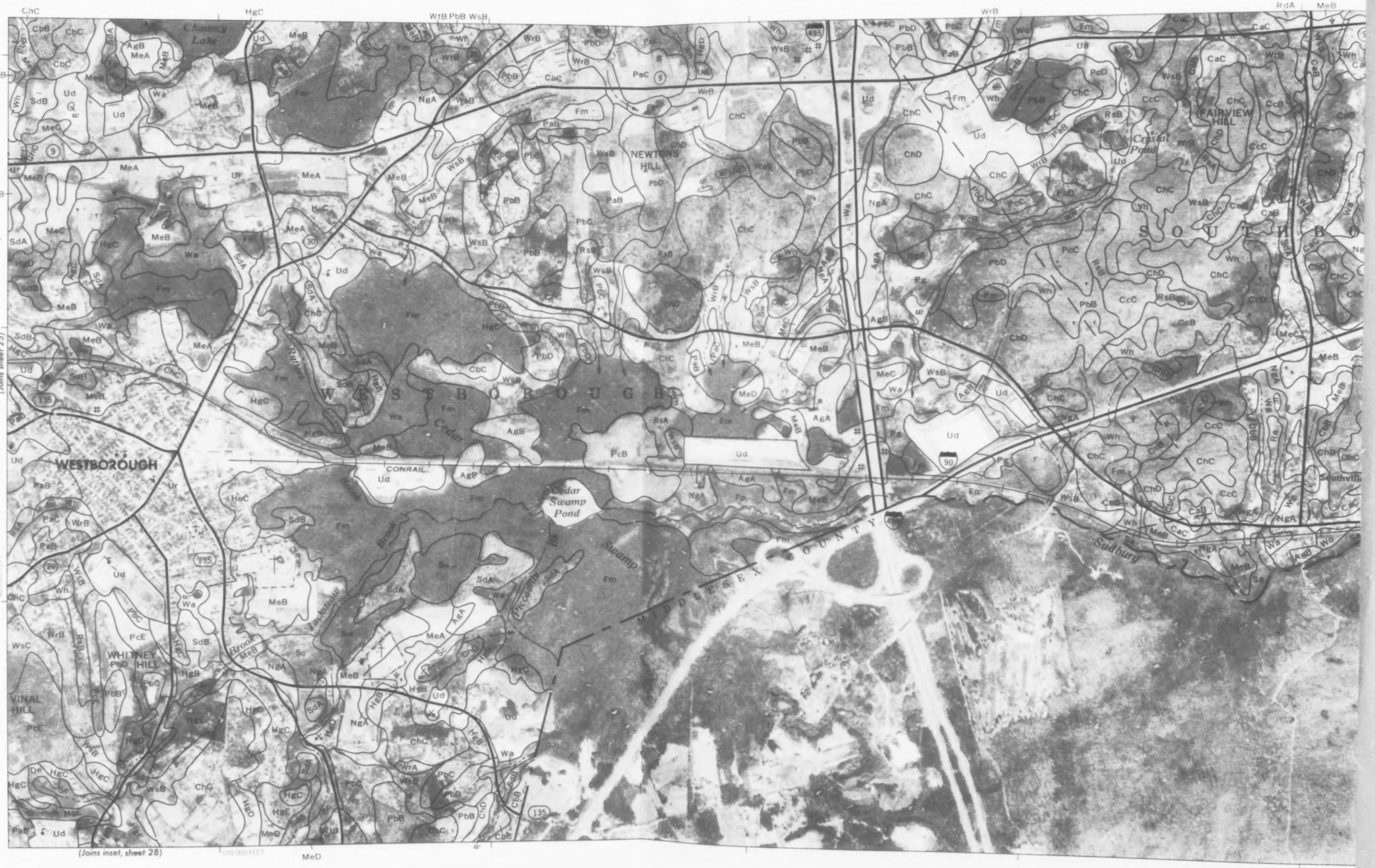
N
MIDDLESEX
SOUTHBOROUGH
WALNUT HILL
WOLFPEN HILL
PINE HILL
CLEAR HILL
MT NEBO
Marion Island
Southborough
CONRAIL
(Joins inset, sheet 14)
(Joins sheet 26)
1 MILE
1 KILOMETER
Scale 1:20,000


N
(Joins sheet 21)
(Joins sheet 27)
(Joins inset, sheet 9)
1 MILE
1 KILOMETER
Scale 1:20,000
WORCESTER MUNICIPAL AIRPORT
WORCESTER
West Tatnuck
Tatnuck
Salisbury Pond
Williams Millpond
Wyman Pond
GREEN HILL
CHANDLER HILL
PROSPECT HILL
MORELAND HILL
WEALTH HILL
CONRAIL
MAINE
EASTON
SURVEY


WORCESTER
PROSPECT HILL
GREEN HILL
MILLSTONE HILL
CHANDLER HILL
Salisbury Pond
Bell Pond
MAINE
CONRAIL
BOSTON
(Joins sheet 25)

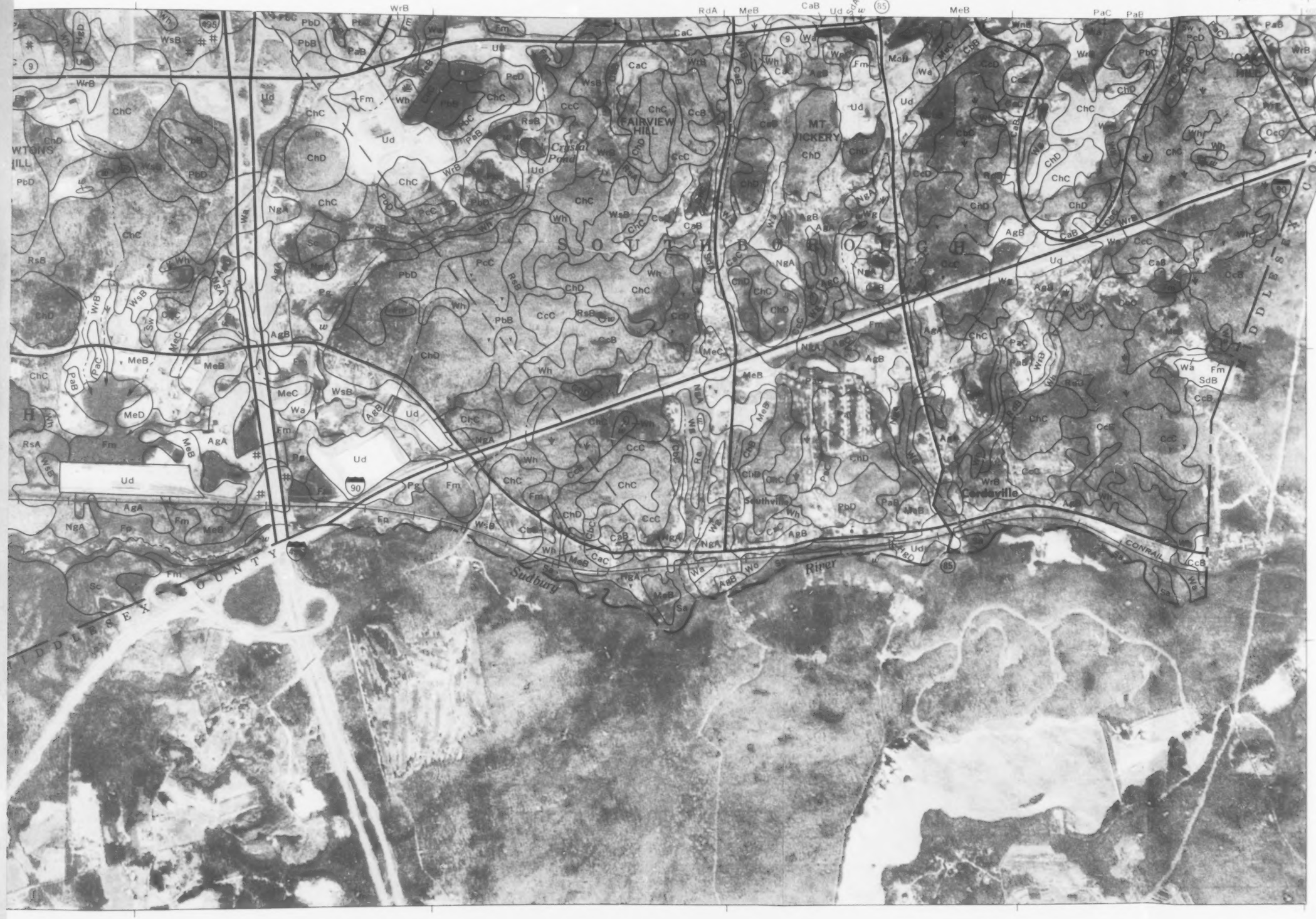

PaB
GOLDEN HILL
TEMPLE HILL
PROSPECT HILL
GREEN HILL
SHREWSBURY
140
20
(Joins sheet 24)

L SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET NUMBER 25


N
Scale 1:20,000
1 MILE
1 KILOMETER
(Joins sheet 25)
(Joins inset, sheet 28)
WESTBOROUGH
NEWTONS HILL
FAIRVIEW HILL
WHITNEY HILL
VINAL HILL
Chauncy Lake
Crystal Pond
Cedar Swamp Pond
Sunamp Brook
Piccadilly Brook
Cedar Brook
Tackshaw Brook
CONRAIL
MIDDLESEX COUNTY
Sudbury
Southville
570 000 FEET

SOIL SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET NUMBER 26

(Joins sheet 23) (Joins inset, sheet 14)



WORCESTER
Middle
Lynde Brook
Coes Pond
Worcester Reservoir
Lynde Brook Reservoir
Leesville Pond
Indian Lake
Quinsigamond River
College Hill
Quinsigamond Village
Ur
Ud
WnA
WnB
WnC
MeB
MeC
MeA
PaB
PaC
PaD
PbC
ChB
ChC
ChD
CgB
CgC
CgD
CgE
CaB
CaC
CaD
CaE
RdA
Lm
De
Fm
Sw
Su
Sun

L SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET NUMBER 27

(Joins sheet 25)
(Joins sheet 27)
1 KILOMETER
0
0.5
1
WORCESTER
SHREWSBURY
Oak Island
Edgemere
Flint
Pond
Brook
SURVEY
SOIL
INSET
(Joins sheet 26)
(Joins upper right)
Piccadilly
MIDDLESEX
COUNTY
LIMIT
OF
SOIL
SURVEY
535 000 FEET
WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — NO. 26

SOIL SURVEY WORCESTER COUNTY, MASSACHUSETTS, NORTHEASTERN PART — SHEET NUMBER 28